FAULT FINDING

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This chapter gives some general directives for locating faults. Most of the modules of the CCU have test sockets at the front. The yellow sockets carry the signals, the red the direct voltages and the black sockets are earth.
When the circuits on the modules have to be checked, the modules may be placed on an extender. Remove the module from its holder.
Then slide the module onto the extender until a click is heard. Subsequently, slide the extender in the holder. NEVER PLACE THE MODULE ON THE EXTENDER WHEN THE LATTER IS ALREADY SLID IN THE HOLDER AND THE CHAIN IS SWITCHED ON. OTHERWISE, THE MODULE MAY BE DAMAGED, FOR EXAMPLE, DUE TO A SUPPLY VOLTAGE BEING CONNECTED TO A SIGNAL LINE WHILE PLACING THE MODULE ON THE EXTENDER.
When the module is to be removed from the extender, take the extender out of the holder. At the bottom of the extender, near the connector a catch is fitted. Depress this catch and take the module out of the extender.
In the case of a module with two printed circuit boards, one of the p.c. boards is hinged. Hinge up this p.c. board.
Place the extender first on the appropriate L-adapter and then place the module on the extender with hinged out p.c. board.
In the case of a module of double width, the module should be placed on two extenders. If necessary, also use the L-adapters.
For the power module a special extender has been designed, in view of its weight. This extender is provided with a cable and plug. Unroll the cable and connect the cable to the module connector. Plug the extender into the holder. The module can now be tested on a workbench. For the printed circuit boards mounted in the camera head underneath the viewfinder, an extension board is available. A similar board is also available for the video amplifiers in the camera head.

A. Power supply

1. When the camera chain cannot be switched on, first check that the mains voltage is present. This is the case when the neon lamp at the rear of the power unit is lit. Subsequently check that all the cables between the power unit, electronics unit and control unit are properly connected. Also check the camera cable.
   If this yiels no result, check the starting circuit with the aid of the detailed circuit diagram of chapter 24 of the CCU.
2. A fault in the power units will be indicated by the POWER FAILURE lamps on the control panel and on the REMOTE module.
   An exception to this is the 12.9 V p.s.u. in the camera. A defect in this unit is indicated by the lamps POWER FAILURE and SCAN FAILURE both lighting up. This is also the case when the p.s.u. supplying the vertical time base is defective.
   By means of the switch and the meter on the REMOTE module it is possible to check which p.s.u. is defective, again with the exception of the 12.9 V p.s.u. in the camera head. A blown fuse in the p.s.u. modules is indicated by a lamp next to the fuse holder. When the module that supplies too low a voltage has been located, a new module can be fitted.
   When the voltage is still too low, check the circuits supplied by the relevant module. For this proceed as follows:
   a. First 2x12 V module. Pull all the modules of the upper row of the CCU out of their holders, except for the PULSE module. The output voltage should now be normal. If not, the fault will be located in the control panel, the registration panel or the wiring.
      When the voltage is normal, refit the modules one by one in their holders until the voltage drops again. The last module will then be defective.
   b. Second 2x12 V module. Pull out all the modules of the lower row, except for the REMOTE module.
      Also remove the PULSE module. Futher proceed as for the first 2x12 V module.
   c. 125 V module. For this, take the PULSE and FOCUS ALIGNMENT modules out of their holders.
   d. 300 V module. Disconnect the 300 V supply from the camera head with the STANDBY switch. Also take the PULSE module out of its holder.
   e. 16 V module. Take the 12.9 V board in the camera head out of its holder.

B. Video circuits

For a fault-finding diagram reference is made to the diagram of the camera head (CAMERA HEAD chapter 1) and that of the electronics unit (CCU, chapter 3). The test points of the modules have been indicated on this diagram. The signals on these test points should be checked by means of the oscilloscope unit, which should then be set to position PROBE.
For checking of the video circuits use is made of the built-in sawtooth generators in the camera head and the CCU.
In the case of incorrect adjustment of the camera, reference is made to CAM. CHAIN, chapter 4, in which the adjust-

ments are described systematically and in the correct sequence.

Case 1. None of the three signals is present on the R-G-B outputs of the chain.

a. Switch on the TEST-2 signal on the control panel. This is the test signal which is injected into the MATRIX module.
When no output signals are obtained, check the VIDEO OUT modules for a common fault such as master black level and clamp pulses.

b. When there are output signals, select the TEST-1 signal. When the signals are displayed on the oscilloscope, this points towards a common fault in the camera head.
This may be the 600-V supply of the plumbicon (300 V and 12.9 V are indicated by lamps on CCU) or an interruption in the light path, e.g. filter revolver unit or lens.

Case 2. One of the R-G-B signals fails.

a. Switch on the TEST-2 signal. When the output signal is not displayed on the oscilloscope unit, check the MATRIX module and the relevant VIDEO OUT module.

b. If the output signal is displayed, set the input selector of the oscilloscope unit to A. Select the TEST-1 signal.
The output signals of the VIDEO IN module are now displayed on the oscilloscope. If the missing signal is displayed, and this the red or blue signal, the MATRIX module should be checked. If this is the green signal, the CONTOUR PROCESSOR, CONTOUR EXTRACTOR and MATRIX modules should be checked.
If the missing signal is not displayed on the oscilloscope unit, check whether the signal is available on the test sockets of the VIDEO IN module. If this is the case, check the VIDEO IN module. If there is no test signal on the test sockets, the defect will be located in the camera head. By connecting of one of the operative channels of the first amplifier (that on the deflection unit) to the defective channel of the second amplifier, the fault can be located down to the first or second amplifier.

3. MON X module
On the MON X module two test sockets PXM (picture monitor) and two sockets VFM (viewfinder) are provided. The upper two sockets serve for the output signals of the right-hand p.c. board and the lower sockets for those of the left-hand p.c. board.
On the latter sockets the signals to the monitor or the viewfinder are available.

4. MON W module
This module supplies the NAM signal to an external oscilloscope unit (e.g. central control desk). On the test socket of the module the output signal is available.

5. Viewfinder
The video signal for the viewfinder is taken from the MON X module and is applied to the viewfinder via cable Compensation unit DG. The output of DG is provided with a test socket.

C. Deflection circuits

1. SCAN FAILURE lights up. If one of the deflection currents is too small or fails, this is indicated by the lamps on the control panel or the REMOTE module.
The camera chain is now set to STANDBY and the picture disappears.
To determine whether the horizontal or the vertical time base is defective, proceed as follows.
The STANDBY relay is located underneath the registration panel. If a screwdriver is inserted between the armature and the solenoid of the relay, the armature will not be attracted, the camera chain is then operative again. When the monitor displays horizontal bars which start moving when the camera is moved up and down, the horizontal time base will be defective.
In that case check the BLANKING, GENERATOR and HOR. OUTPUT board. When vertical bars are displayed, the vertical time base will be defective and the SCANNING module should be checked.

2. Time base not synchronised
The H pulse which synchronises the horizontal oscillator in the camera head, is supplied by the PULSE module. The outgoing H pulse can be checked on test socket OUT of this module. When the pulse is present, the BLANKING generator board in the camera head should be checked. If the pulse is not present, check the PULSE module.
When the vertical oscillator is not synchronised, check the oscillogram of the signal on the test socket of the SCAN module. When a needle pulse "moves" over the sawtooth, this is an indication that the V pulse is present. In that case the defect will generally be located in the SCANNING module. If no deedle pulse is displayed, first check the PULSE module and then, if necessary, the SCANNING module.

D. Intercom and cueing

In the relevant chapters complete diagrams are given, on which the circuits and connections with camera and CCU are indicated.

Note: The voltage values and oscillogrammes given in the circuit diagrams are average values. Deviations of approx. 10 % are permissible unless otherwise stated. Measurement values of individual modules serve merely for guidance. Deviations are permissible provided that the "overall" specification of the camera chain is met (see Chapter 2. Camera Chain).