GETTING STARTED

1707

Digital Triax

Camera

TH

THOMSON MULTI MEDIA
BROADCAST SOLUTIONS

Getting Started

This manual provides a quick overview of the most important functions and features of the TTV / LDK 1707 digital triax camera. Much more information can be found in the user manuals. This Getting Started manual assumes that you have had some previous experience with operating cameras.
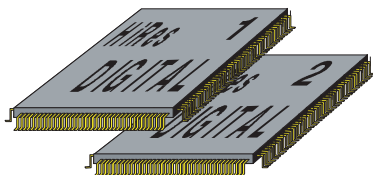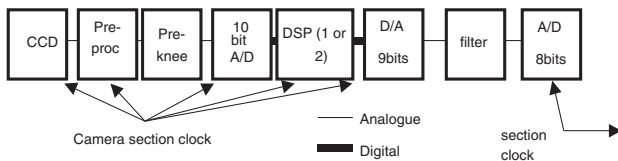
Subjects

Digital Video Signal processing

- 12-bit A/D converter for excellent resolution in gray and color tones

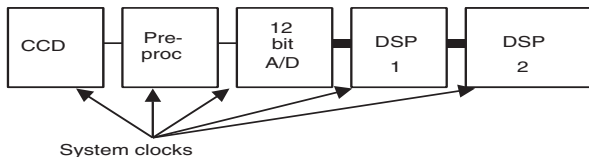- Video processing is digital; no analogue pre-gammas, etc.

- Two powerful DSPs with 22-bit internal accuracy

- **No** analogue intermediate steps

Block diagram of a typical camera:

Block diagram of the TTV / LDK 1707:

Audio Signal processing

- The TTV / LDK 1707 audio processing is unique for the industry:

It's completely digital!

All audio processing is carried out in the digital domain including filters, limiters, gain and AGC.

```
Mic          ▷   /    22 bit      ═══   Digital Audio         To
level                  A to D           Processor            SDI
                                                             output
```

The result is superb audio performance:
- Phase characteristics, Amplitude characteristics, Low noise, Low distortion, Extreme accuracy

Ambient microphone link

An electrostatic or electrodynamic microphone connects to the camera to provide high quality audio. A switch selects the phantom 48 Volt supply. An input attenuation of 20 dB can also be set. The microphone sensitivity is continuously adjustable from -6 dB to +12 dB.

Intercom link

A high power intercom connects the cameraman to the producer. A variable listening level gives the cameraman good audibility under all circumstances. The link is either via 4 wires (outward-going and return sound over separate pairs) or via an RTS device.

Uncompressed 4:2:2 digital link

The 1707 camera system includes an all-new digital triax link. The camera head sends an uncompressed 4:2:2 digital signal to the Channel Control Unit (CCU).

The connection continues to make use of standard triax cable so you can continue using your cable stock. The familiar triax cable guarantees high durability and reliability even in severe conditions.

Hardware compatibility

The quality and transparency of this digital link means that cameras and CCUs can easily be interchanged without risk of colour changes. And because the standard CCIR601 digital signal is used for the link, the clock frequency and bit rate is the same irrespective of the aspect ratio (16:9 or 4:3) or the number of lines (525 or 625).

This link carries the 270-Mbit digital video with the audio signal embedded. The intercom and control data are also embedded into the serial data stream.

The compact CCU provides three SDI serial 270-Mbit digital outputs.

Installing a 1707 camera system is very simple.

- Connect the camera to the CCU using a standard Triax cable of 9mm or 13 mm diameter. (The maximum length with 13mm cable is 500m. This can be extended to 3km by using the optional optical fibre cable system).

- Connect the operational control panel (OCP40, 42 or 50) to the CCU DT500 using the RS422 cable which carries both control and power signals.

- Connect your studio system to the rear of the CCU and then supply it with power. Switch on the power to the CCU.
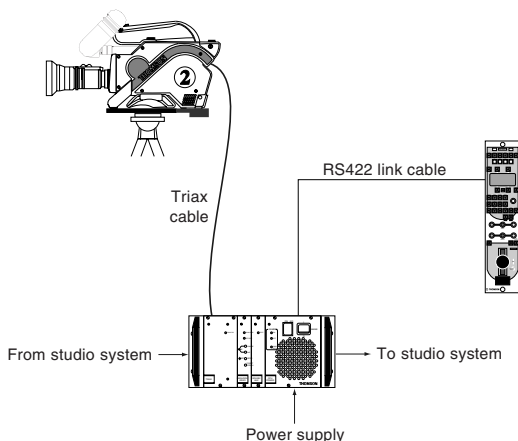

Other Cameras
Because of the identical control system, the 1707 camera can be fully integrated into a type TTV1657, TTV1657D or 1557D camera environment.

From CCU to camera, the triax cable carries 2 return video signals, the camera time base generator control signal, the remote control signals and power to supply the camera. The frequency allocation for these signals is as follows:
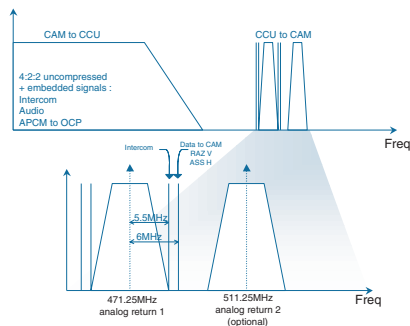
The camera provides the following outputs:

- **External video**

  An external video signal applied to the CCU is out put on the first return channel.

- **Teleprompter channel**

  A second (optional) video return signal can be used as a teleprompter channel.

- **Video monitoring**

  The built-in encoder in the camera head allows you to monitor camera video on a colour monitor.

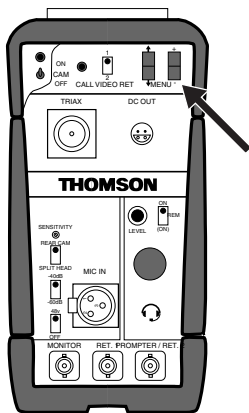- **DC OUT source to supply auxiliary equipment**

  A 30 to 52 V DC supply is available to supply an external DC-to-DC converter for powering the teleprompter for example.

- **Intercom**

  An output for the microphone-headset of the cameraman.

The rear panel allows fast access to the various connectors, switches and controls.

The menu control buttons allow you to choose and modify the cameraman's operating functions. These include monitor selection, filter selection and viewfinder marker selection.

When these switches are activated the selection menus appear in the viewfinder.

Filter wheel controls
Two motor-driven filter wheel controls are optionally avalable at the front of the camera. The smaller wheel controls the neutral density filters; the larger wheel controls the effect filter wheel.

• Neutral Density filters
  Four separate values 1, 1/4, 1/16, 1/64 gives you the freedom to control depth of field and contrast also in sunny conditions!

• Effect filters
 The four effect filters include Clear, 4-star, Strong fog and Light fog positions.

Colour filters are no longer required. White balance is achieved electronically, giving the best noise, contrast, and shading performance.

The DT500 CCU has a light and compact design so you can build it into half a 19-inch rack bay beside other accessories such as a vectorscope or a waveform monitor, or you can fit two DT500s beside each other.

The front panel shows the status indicators. It also gives fast access to the different adjustments for genlocking.
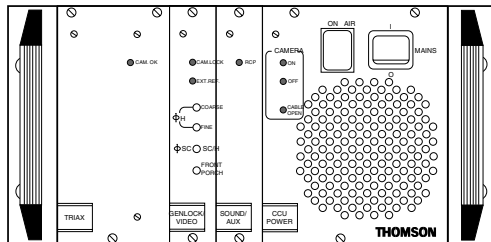
Input signals
- 1 Genlock (BBS video)
- 2 return video channels from CCU to Camera (one optional)
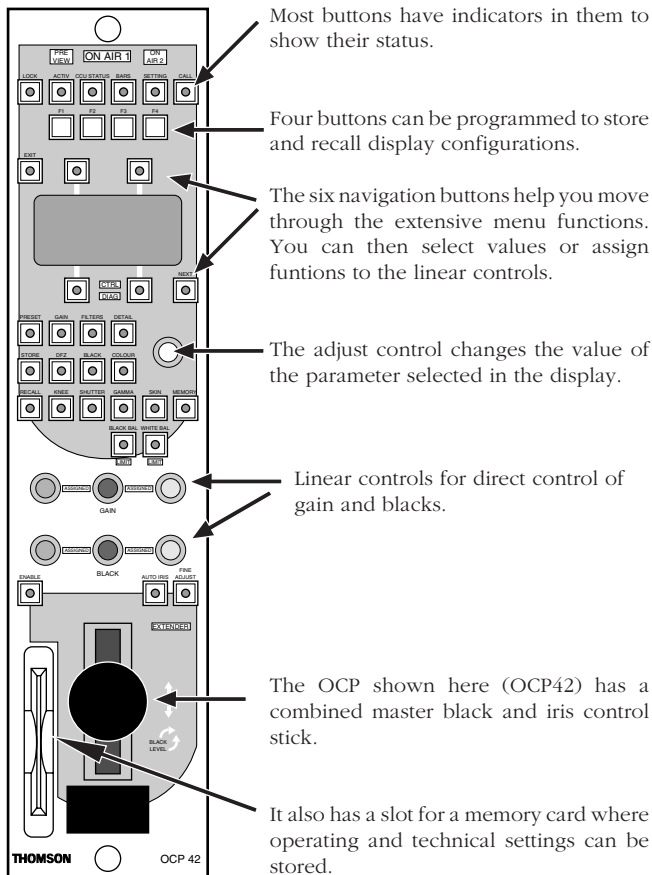- On-air 1 and On-air 2 indications

Output signals
- 3 digital outputs 270 Mbits
- 2 encoded video signals (PAL or NTSC)
- 1 camera microphone output

Other signals
- 1 Intercom (4-wire or RTS)
- Power supply

Operational Control Panel

The clear LCD display of the OCP gives you access to all the features of the camera via a menu system.

Most buttons have indicators in them to show their status.

Four buttons can be programmed to store and recall display configurations.

The six navigation buttons help you move through the extensive menu functions. You can then select values or assign funtions to the linear controls.

The adjust control changes the value of the parameter selected in the display.

Linear controls for direct control of gain and blacks.

The OCP shown here (OCP42) has a combined master black and iris control stick.

It also has a slot for a memory card where operating and technical settings can be stored.

Several pre-calibrated settings for colour temperature are available: 3200K and 5600K.

Colour temperature can also be adjusted in steps of 100K between 2200K and 9900K to create mood pictures.
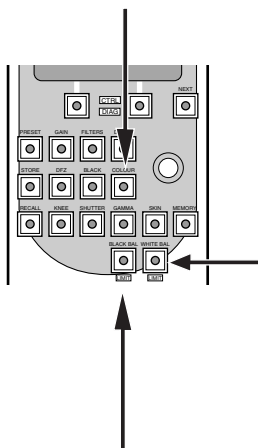
Pushing the white balance button starts the measurement. The white surface to be measured should be located in the centre of the viewfinder picture.

Push the switch again while the measurement is taking place to switch on continuous white balance. Push the switch once again to it off.

Push the black balance button to start the black pulse and black level balancing. When balancing is complete the indicator goes out.

The 1707 camera system uses a set of files for the easy recall and storage of system information. Several different types of file are used:

- Operation files contain the panel operational settings.
- Scene files are used to store all information that influences the picture. Four scene files are available for each camera.
- Two lens files are used to store flare and shading parameters pertaining to specific types of lens.
- Matching settings are technical setting used to obtain the same colourimetry levels on different cameras.
- Additional technical values are stored in the Tech type files.

Scene files

These are four operational setting memories accessible from the OCP enabling storage, repeat, transfer and configuration retrieval operations. The configurations stored are saved when the equipment is switched off.

Use the OCP Store button to call up the four memory positions to the OCP display. Simultaneously press the Store button and one of the numbered buttons to store the current operating settings in a memory position.

Use the OCP Recall button to call up the four memory positions to the OCP display. Press one of the numbered buttons to recall the operating settings from that memory position to the OCP.

Technical files

The lens files, the matching files and the tech. files are stored on a memory card that has been configured as a Camera card. The Camera memory card can be used as a means of moving technical information between different cameras.

The OCP42 and OCP50 use memory cards to store operating settings, scene files, lens files, matching and technical parameters.

A memory card can be set up as either a Studio card or a Camera card.
- A Studio card is used to store the four camera scene files and the individual operating settings for up to 24 different cameras.
- A Camera card is used to store operating settings, scene files and technical values for a single camera.

To change a card's configuration, proceed via the OCP's PRESET/ NEXT/NEXT keys to the ERASE CARD menu item and erase the information on the card.

Studio card
To set up a Studio card use the OCP Memory button to call up the Store and Recall functions to the OCP display. Using the buttons above the display, select either the Store or Recall function for the memory card.
- Choose WRITE CARD to save all the operating settings and the four scene files for the connected camera onto the memory card.
- Choose WRITE CAM to transfer all the operating settings and the four scene files from the memory card to the connected camera.

Camera card
To set up a Camera card use the OCP's SETTING button and proceed via the CAMERA menu item and the NEXT key to the CAM CARD menu item. Select CAM CARD to bring the Store and Recall functions to the OCP display. Using the buttons above the display, select either the Store or Recall function for the memory card.
- Choose WRITE CARD to save all the operating settings, the four scene files and the technical values for the connected camera onto the memory card.
- Choose WRITE CAM to transfer all the operating settings, the four scene files, and the technical values from the memory card to the connected camera.

Digital 12-bit video processing gives many advantages:

- Gain in steps of 3 dB from - 3 dB to + 21 dB.

- Automatic black shading correction.

- White shading correction.

- Automatic pixel correction:
  Pixel correction is intended to reduce non-uniformity between pixels. This feature corrects the pixels which may have become defective with time.

- Automatic flare compensation.

- Matrix (Masking):
  Matrix correction enables very accurate colorimetry and colour identity adjustment for all cameras. You can store three matrix values enabling colorimetric matching of the 1707 with other cameras while retaining the reference EBU matrix values.

- Gamma:
  Gamma correction provides excellent rendering of low illuminated areas of the image. Several gamma curves are provided: Factory, Custom, BBC and CCIR. You can modify the gamma corrections of the three primaries R, G and B individually for each curve.

- Black stretch:
  Black stretch is used to increase or decrease the black gain without affecting the remainder of the image by modifying the gamma correction response.

__Extended contour correction__

The powerful 22-bit internal accuracy of the DSPs provides the opportunity for extended features with respect to contour correction.

Contour correction includes an aperture correction centered on 6-7 MHz to compensate for the loss in modulation depth up to 6 MHz, and a physiological correction centered on 3-4 MHz to provide image relief. This correction is generated by the three R,G,B channels.

Video signal with contour and lowpass optical filter
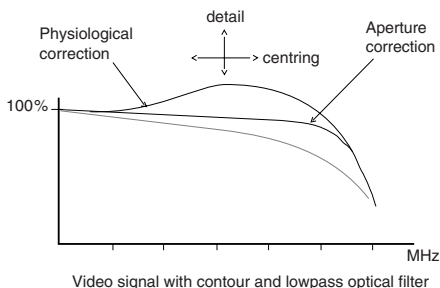
Noise suppression on the horizontal and vertical contour signals is gain controlled. The final contour correction level is reduced in the dark areas of the image to decrease noise visibility.

__Other contour features__

Other contour features are:

- **Soft contour**
  The system features a high amplitude detail compressor.

- **DIAG contour**
  This function reduces the cross colour phenomena by decreasing the amplitude of frequencies close to the subcarrier.

- **Detail Follows Zoom (DFZ)**
  This function is used to reduce or increase the detail level according to the zoom position providing sharper contours in wide-angle shots.
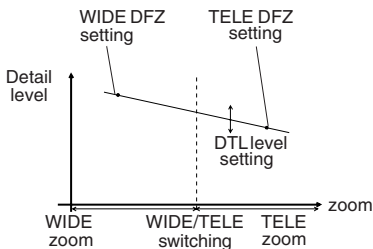
- **Dual skin detail**
  This feature allows the detail level on any two hues chosen either manually or automatically to be varied.
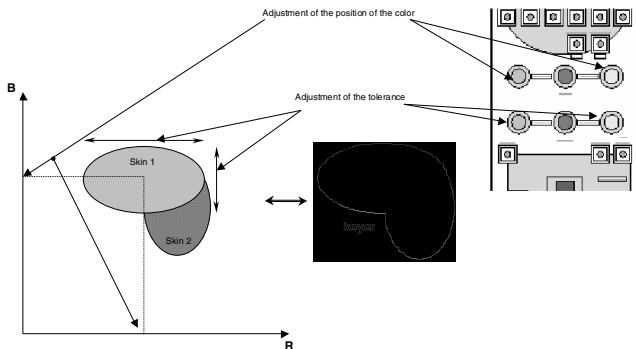
You can vary the amplitude of the contour signal as a function of colour. For example, you might reduce the amount of detail in the face to ensure satisfactory rendering of portraits.

• Knee compression saturation control

  The compression system reproduces parts of the picture that are very bright and which exceed the nominal level by reducing the dynamic range - the knee function.
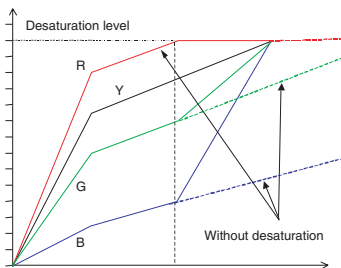
  The contrast compression system used in the 1707 restores the luminance and chrominance, as well as contours in over-exposed areas, so avoiding desaturation. This enables fullest use to be made of the wide contrast range provided by the sensors and the 12-bit video processing.

• Shutter/clear scan

   The **shutter** reduces the acquisition time to avoid the fuzziness on moving pictures.

   The **clear scan** function adjusts the camera's acquisition time so that it is in phase with computer screens that are being filmed.
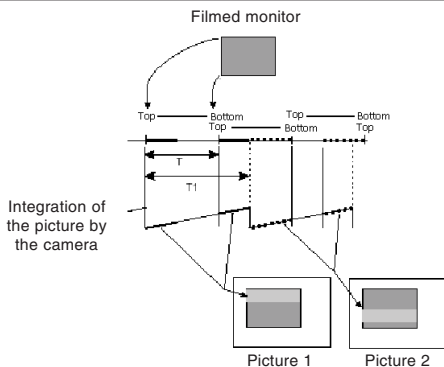
In this example, the camera integration time T1 is bigger than the monitor scanning time T. Some part of the monitor picture will be integrated twice and provoke a moving high luminance bar.

- Dynamic pixel correction

  The 1707 includes a system that compensates automatically for faulty pixels. This dynamic function analyses the picture continuously, providing real-time correction for defective pixels without needing maintenance.
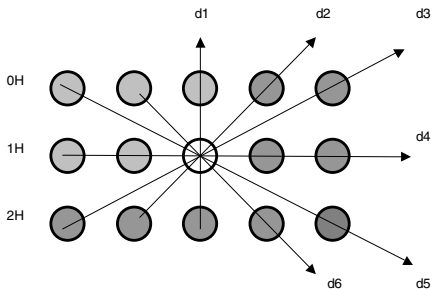
And so you see, the 1707 camera system provides a true digital broadcast camera link, where processing and transmission take place in the digital domain, complete from CCD sensor to video mixer.

More cool stuff

- Yes, there's more!
  We hope you will discover this soon - by yourselves, of course - by exploring the many features available in this truely digital camera system.

- Hopefully, this short manual has helped you get used to using the camera and that you have already started appreciating the qualities of the TTV / LDK 1707 digital triax camera system.

We wish you lots of pleasure operating the camera!

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