

# UM-LT05 Manual

## Video & Audio transmission



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## 1.0 Introduction

In 2009 Dr Kao received the highest scientific honour, the Nobel prize “for ground breaking achievements concerning the transmission of light in fibres for optical communication”.



Dr. Charles K. Kao, an engineer born in Shanghai, recognised that the attenuation of the glass fibre is due to impurities and not to the silica glass itself that the optical glass fibres could make their way. In the April 1966 issue of the “Laser Focus” magazine one can read:

Charles K. Kao „At the IEE meeting in London last month, Dr. C. K. Kao observed that short distance runs have shown that the experimental optical waveguide developed by Standard Telecommunications Laboratories (STL) has an information carrying capacity ... of one gigacycle, or equivalent to about 200 TV channels or more than 200,000 telephone channels. He described STL’s device as consisting of a glass core about three or four microns in diameter, clad with a coaxial layer of another glass having a refractive index about one percent smaller than that of the core. Total diameter of the waveguide is between 300 and 400 microns. Surface optical waves are propagated along the interface between the two types of glass.”

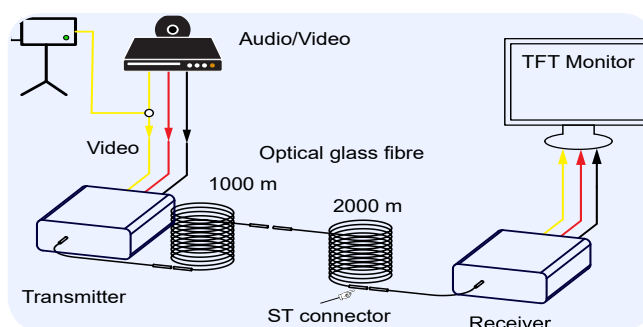
“According to Dr. Kao, the fibre is relatively strong and can be easily supported. Also, the guidance surface is protected from external influences. ... the waveguide has a mechanical bending radius low enough to make the fibre almost completely flexible. Despite the fact that the best readily available low loss material has a loss of about 1000 dB/km, STL believes that materials having losses of only tens of decibels per kilometre will eventually be developed.”

Nowadays optical glass fibres with an attenuation below 0.5 dB/km at 1.5  $\mu\text{m}$  wavelength are state of the art. So, based on this history, taking roughly 40 years dropping down the attenuation of glass fibres to usable values.

These days as one reaches out for the phone to call somebody up, one hardly realizes the great technological change that has taken place during the past decade in the field of telecommunications. This is also a characteristic of the epochal change from an industrial society to a communication society.

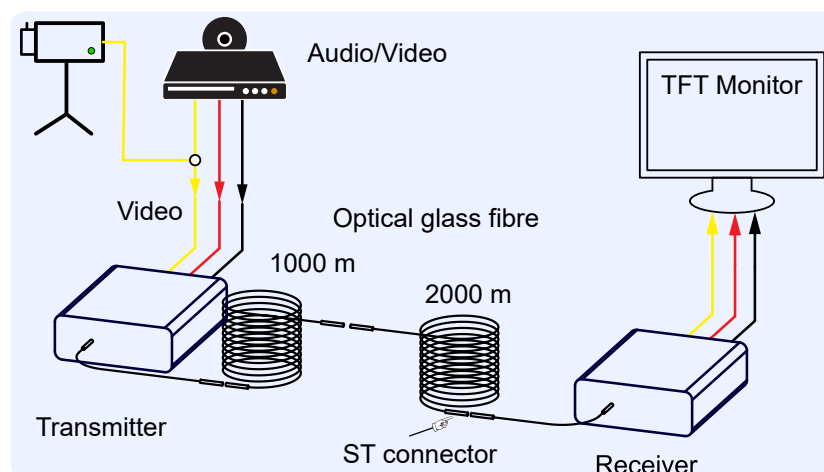
Today, information transmissions through laser diodes and glass fibres are the order of the day and the developments in this area belong to the most important ones in this century. This technology is based on the already known fundamentals so that no new understanding needs to be imparted. In practice, technically, however it means new challenges.

In the fibres used today, light is conducted within a core diameter of only 9  $\mu\text{m}$  and for that on the one hand the fibre production and on the other, the fine mechanical components which are necessary for the launching of the light and for the installation of the fibres, need to be developed.



This experiment comprises two drums of multimode fibre with one 1000 m and two 2000 m long multimode fibre. With this set, data transmission segments can be realized with a length of 1000 m, 2000 m and 3000. The fibre drums are equipped with ST fibre jacks and by means of the provided fibre patch cable they can be interconnected. As signal sources a colour CCD video camera and a DVD - Player as audio as well as video source are used. They are connected to the fibre transmitter which converts the electronic signals into digital optical signals which are guided via the optical fibre to the optical receiver where the signals converted back to electronic audio as well as video signal. These signals are connected to a regular TV to watch the transmitted video as well as listen to the simultaneously transmitted audio. The optical signals having a wavelength of 1.3  $\mu\text{m}$  and are detected in addition by the optional fast InGaAs photodetector. The amplitude can be shown on an oscilloscope and the amplitude measured for the 3 different length of the data segment. For each measurement the input and output power is measured and from this relation the fibre attenuation calculated.

## 2.0 General remarks



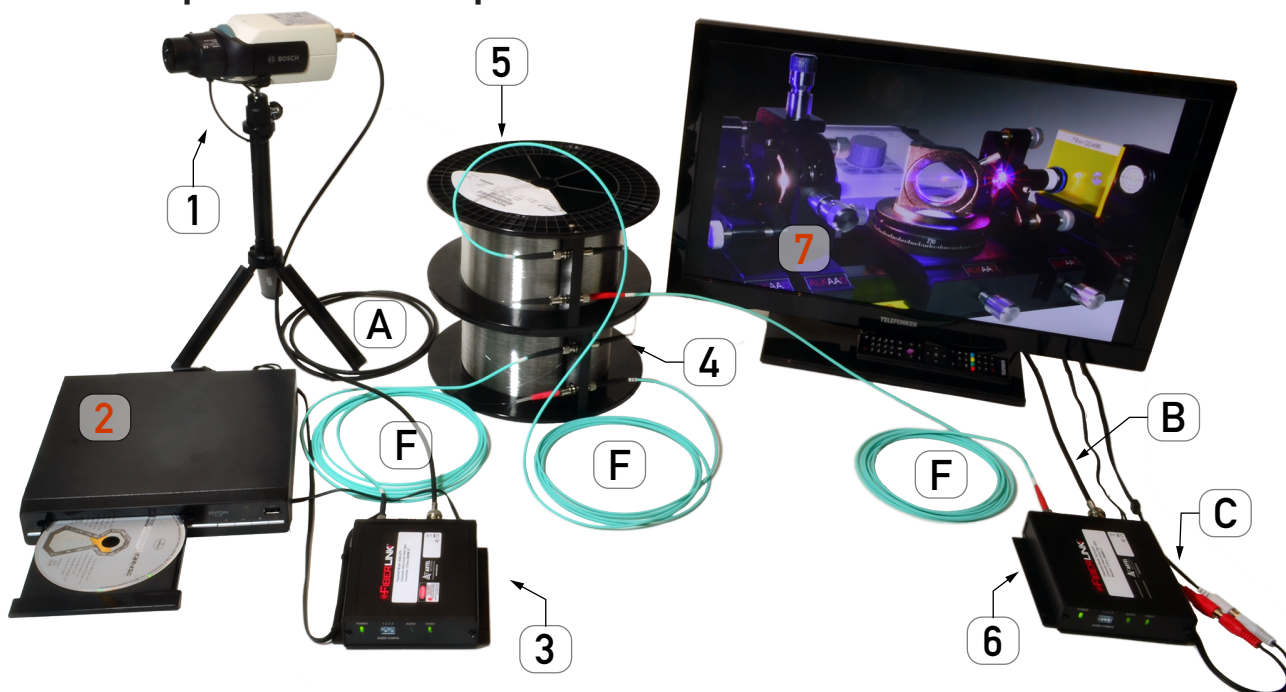
**Fig. 1: Principle of the experiment**

The video signal (yellow lines) is generated either by the CCD camera or by the DVD player, whereby the DVD player provides the audio signal. Furthermore the DVD player has a USB connection from where video as well as still pictures can be send to the transmitter. The video and audio signals are converted by the transmitter to modulated optical signals and made available at a ST panel jack. Optical glass fibre with a length of 1000 m and 2000 m are coiled to a drum and provided with ST panel jacks. The optical connection between the transmitter and the first fibre segment is established by means of a ST fibre patch cable. In the same way the two fibre segments are linked to each other and connected to the receiver.

The optical signal is converted back to the video as well as audio signal and are connected via standard BNC and cynch connection cable to the TFT monitor.



### 3.0 Description of the components



**Fig. 2: LT-0500 Fibre Video & Audio Transmission**



**Fig. 3: CCD Camera (1) on tripod**

The CCD camera (1) is mounted onto a tripod for table top operation. The iris of the lens is controlled by the camera electronics, distance and focus can be set manually and independent from each other. The video signal is available at the rear of the camera via a BNC jack. The power supply is connected with a two pin connector.



**Fig. 4: DVD player (2)**

A state of the art DVD player is used as an audio as well as a video source. At the front a USB connection is provided to accept USB sticks with video, audio and still picture files. At the rear the two audio output channel as well the video out is available. To use these, the provided BNC

cable which is also used by the camera a cynch to BNC adapter is inserted into the video cynch output. The audio and video outputs are connected to the transmitter (3).



**Fig. 5: Fibre link transmitter (3)**

The fibre link transmitter accepts composite video and two channel audio signals. A power supply (12 VDC) is provided with a mating connector. The video signal either from the camera or DVD player is connected to the video BNC panel jack. The audio signal cables are plugged into the audio out put panel jacks of the DVD player (2), see Fig. 4. One of the provided patch cable (F) is used to connect the transmitter (Out: Fibre ST) to the input of the first fibre segment (4). The wavelength of the emitted light into the fibre is 1.3  $\mu\text{m}$ . Once a video signal with sufficient amplitude is present, the Video LED of the transmitter lights up. In case a suitable audio signal is present, the Audio LED of the transmitter starts blinking.



**Fig. 6: Optical fibre coiled on a drum (4 and 5)**

The experiment comes with two fibre drums, one with 1000 metre and the other with 2000 metre multimode fibre

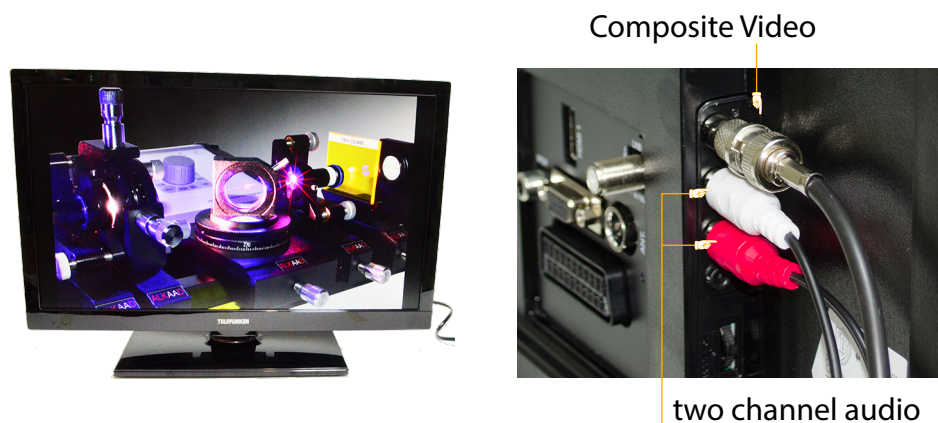
with a core diameter of 50  $\mu\text{m}$  and cladding diameter of 125  $\mu\text{m}$ . It is a commercially available fibre as used in telecommunication networks. Both fibre ends are terminated with ST connectors and plugged to the mating ST panel jacks. The specifications of the fibre is printed onto a label at the top of the spool. In the Fig. 6 the 2000 metre fibre drum is depicted. According to the label this fibre has a loss of 0.537 dB/km and a bandwidth product of 3078 MHz  $\cdot$  km at a wavelength of 1.3  $\mu\text{m}$ .



**Fig. 7: Fibre Link receiver (6)**

The end of the last fibre drum is connected to the optical input (In: Fibre ST) with one of the provided fibre patch cable (F). The video signal is available at the BNC panel jack and the audio signal via two cynch connector. The audio signal is connected to the monitor by means of the provided cynch cable (C). The video signal is connected to the monitor with a BNC cable (B).

Further information of the Fibre Link transmitter and receiver are given in chapter 4.1 on page 6.



**Fig. 8: Video and audio monitor**

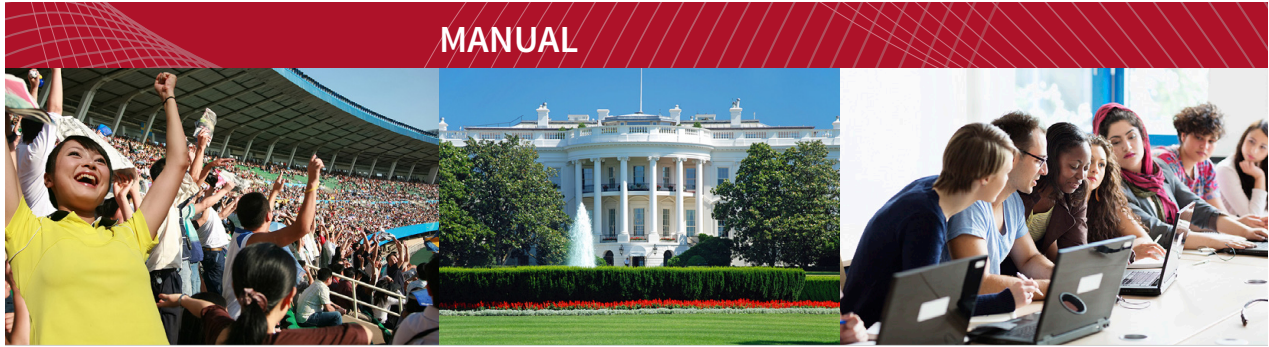
A modern LED TFT monitor is used to display the video which has been sent along the 1000, 2000 and 3000 metre long fibre line. The video output is connected by means of the BNC cable to the monitor. A BNC to cynch adapter is provided to enable the connection to the cynch panel jacks of the monitor. The audio signal is connected via the cynch cable (C) to the audio input cynch panel jacks of the monitor.

More information about the monitor are given in chapter 4.2 on page 19.



## 4.0 Addendum

### 4.1 FiberLink Transmitter and Receiver



## FiberLink® 3620A Series



**Composite Video and Two Channels  
of Audio over one single mode or  
multimode fiber**

**Installation and Operations  
Manual**

**WWW.ARTEL.COM**



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## Welcome

Thank you for purchasing Artel Video Systems' FiberLink 3620A Series. The 3620A Series is used to transmit Composite Video over a single fiber optic core as well as 2 channels of audio. The FiberLink 3620A series is compatible with single mode or multimode fiber. The system utilizes all digital processing to deliver noise-free transmission. The 3620A series is a cinche to install with no equalization, deskewing or special tools required.

## Features

- 10 MHz video bandwidth per channel
- Video channel is compatible with NTSC, PAL or SECAM video standards
- Two audio channels that may be user-configured for balanced or unbalanced inputs and outputs
- Switch selectable audio output gain boost of +0 dB or +6 dB
- Indicator LEDs monitor power, video and audio signals
- Transmits over one multimode or single mode fiber
- No adjustments; pure digital processing and transmission
- Wide range power supply allows operation from both AC and DC sources
- System consists of transmitter and receiver unit; card or box version.
- Card version fills one slot in 6000A card cage

## Package Contents

- One FiberLink 3620A or 3621A
- This User's Manual

## Technical Specifications

### Model Part Number Specification

| Unit Type             | Part Number |
|-----------------------|-------------|
| Transmitter Box       | 3620A-B7S   |
| Transmitter Rack Card | 3620A-C7S   |
| Receiver Box          | 3621A-B7S   |
| Receiver Rack Card    | 3621A-C7S   |

### General Specifications

|                                    |   |
|------------------------------------|---|
| Indicators                         | Power, Video, Audio,<br>Alarm (Card version)                                |
| Box Version Dimensions             | 5 W x 1.15 H x 5.25 L (inches)<br>127 W x 29 H x 203 L (mm)                 |
| Weight                             | approx. 10 oz.; 0.284 kg  |
| Number of slots in 6000A card cage | 1   |
| Power                              | 9-24 volts AC or DC, 3.5 watts<br>11.94 BTU/Hr<br>(Transmitter or Receiver) |
| Operating Temperature              | -10° to +60° C  |
| Operating Wavelength               | 1310nm  |
| Optical Connector                  | ST  |

### Video Specifications

|                        |                                       |
|------------------------|---------------------------------------|
| Frequency Response     | 10 MHz (-3 dB), $\pm 0.2$ dB to 5 MHz |
| Input/Output Impedance | 75 Ohms, nominal                      |
| Signal-to-Noise Ratio  | 60 dB (CCIR weighted)                 |
| Differential Gain      | 0.5%                                  |
| Differential Phase     | 0.5°                                  |
| Y/C Delay              | < 10 ns                               |
| 2T K-Factor            | 0.5%                                  |
| System Gain            | Unity Gain, $\pm 3\%$                 |
| Video Connector        | BNC                                   |



## Technical Specifications

| Audio Specifications               |  |
|------------------------------------|--|
| Number of Audio Channels           | 2, balanced or unbalanced  |
| Bits per sample/ Sampling Rate     | 24 bits, 52 kHz  |
| Audio Connector                    | Screw terminal block   |
| Switches                           | <ul style="list-style-type: none"> <li>Select input termination</li> <li>Balanced or unbalanced input/output, selectable on a per-channel basis</li> <li>Output gain boost +0 dB or +6 dB</li> </ul> |
| Frequency Response                 | +0/-0.5 dB, 20 Hz - 20 kHz   |
| Maximum Audio Level                | +10 dBu  |
| Signal-to-Noise Ratio (A-weighted) | 95 dB referenced full scale (balanced)   |
| THD                                | 0.002%, 20Hz - 20 kHz, full scale  |
| Channel Phase Differential         | $\pm 0.1^\circ$  |
| Crosstalk                          | -100 dB (1kHz)   |
| Audio Noise Level                  | -85 dBm  |
| System Gain                        | Unity Gain, $\pm 3\%$ , input: balanced 600 Ohms, 50 Ohms source impedance ; output: balanced into 600 Ohms, gain boost 0 dB.  |
| Receiver Output Gain               | +0 dB or +6 dB; switch selectable  |
| Input Impedance                    | 600 Ohms terminated,<br>>24K Ohms unterminated   |
| Output Impedance                   | 50 Ohms nominal  |
| Audio to Video Diff. Delay (skew)  | <300 usec  |

### Optical Loss Budget & Maximum Useable Distance

| Fiber Type              | Loss Budget | Distance |
|-------------------------|-------------|----------|
| Single Mode Fiber       | 0-17 dB     | 40km     |
| Multimode Fiber (62.5u) | 0-20 dB     | 7.5km    |
| Multimode Fiber (50u)   | 0-20 dB     | 5km      |

\*Distance specifications are approximate and are not guaranteed.  
Operating loss budget must not be exceeded.

### Alarm Switch Settings & Options

The Rack Card version of this product has an additional red indicator LED that illuminates when an alarm condition exists.

The rack card unit also provides an output to drive a model 6020A Alarm Sensing Module which provides an audible tone and activates a set of contacts for external signaling purposes.

#### Alarm Switch Settings for the Transmitter Card

| Switch Position | Alarm Indication    | On      | Off      |
|-----------------|---------------------|---------|----------|
| 1               | Loss of Input Video | Enabled | Disabled |
| 2               | N/A                 | N/A     | N/A      |

#### Alarm Switch Settings for the Receiver Card

| Switch Position | Alarm Indication       | On      | Off      |
|-----------------|------------------------|---------|----------|
| 1               | Loss of Optical Signal | Enabled | Disabled |
| 2               | Loss of Input Video    | Enabled | Disabled |

## Installation Instructions

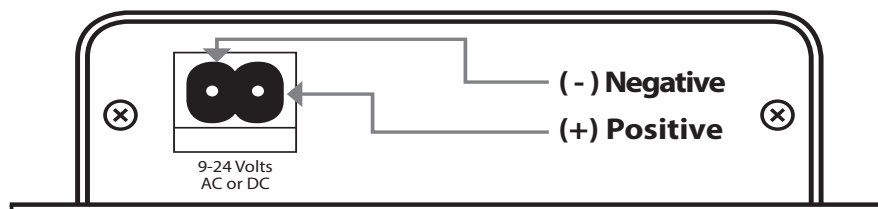
The FiberLink 3620A Series of fiber optic transmission systems are ready for immediate use and do not require any special tools or equipment. However, an Optical Power Meter, such as the FiberLink 6615, can be useful in determining optical loss budgets during your systems design and maintenance.

### The following instructions describe the typical installation procedure:

- 1) Connect the video source to the video input BNC connector on the transmitter unit.
- 2) (Optional) Connect your audio source to the audio input on the transmitter unit.
- 3) Connect the video output cable to the video output BNC connector on the receiver unit.
- 4) (Optional) Connect audio output cable to the audio output on the receiver unit.
- 6) Connect the fiber optic cable to the transmitter and receiver units.
- 7) Connect the Universal Power Supply to the transmitter and receiver units.  
For box versions using DC power, please refer to figure 1.
- 8) Configure your audio preferences as described in the Audio Configuration section of this manual.
- 9) When power is applied, the green POWER LED should illuminate, indicating the presence of operating power. The Video and the Audio LEDs will give an indication as described in the Indicator LED's and Alarm Circuitry section of this manual.
- 10) The system should now be operational.

*Note: The Rack Card version has an additional red LED for indicating the presence of an alarm condition (loss of signal). Refer to Indicator LED's and Alarm Circuitry sections of this manual.*

**Figure 1:**  
**Power Connector**  
**DC Input Polarity**









**DANGER!**







The transmitting element in the FiberLink 3620A transmitter unit contains a solid state Laser Diode located in the optical connector. This device emits invisible infrared electromagnetic radiation which can be harmful to human eyes. The radiation from this optical connector, if viewed at close range with no fiber optic cable connected to the optical connector, may be sufficient intensity to cause instantaneous damage to the retina of the eye. Direct viewing of this radiation should be avoided at all times!

## Audio Configuration (Transmitter):

The FiberLink 3620A Transmitter units have a four position DIP switch that is accessible from the front panel. Operation is as follows:

| Audio Configuration Switch Settings (Transmitter Box) |   |   |   |
|---|---|---|---|
| Channel<br>(Switch Position)                          | Balanced<br>(600 Ohms)  | Balanced<br>(24k)   | Unbalanced<br>(24k)   |
| <b>Channel 1</b><br>Controlled by<br>Switches 3 & 4   | <br>Switch 3 Up<br>Switch 4 Down | <br>Switch 3 Up<br>Switch 4 Up | <br>Switch 3 Down<br>Switch 4 Up |
| <b>Channel 2</b><br>Controlled by<br>Switches 1 & 2   | <br>Switch 1 Up<br>Switch 2 Down | <br>Switch 1 Up<br>Switch 2 Up | <br>Switch 1 Down<br>Switch 2 Up |









  

| Audio Configuration Switch Settings (Transmitter Card) |  |   |  |
|--|--|---|--|
| Channel<br>(Switch Position)                           | Balanced<br>(600 Ohms)   | Balanced<br>(24k)   | Unbalanced<br>(24k)  |
| <b>Channel 1</b><br>Controlled by<br>Switches 3 & 4    | <br>Switch 3 On<br>Switch 4 Off | <br>Switch 3 On<br>Switch 4 On | <br>Switch 3 Off<br>Switch 4 On |
| <b>Channel 2</b><br>Controlled by<br>Switches 1 & 2    | <br>Switch 1 On<br>Switch 2 Off | <br>Switch 1 On<br>Switch 2 On | <br>Switch 1 Off<br>Switch 2 On |









## Audio Configuration (Receiver):

The FiberLink 3621A Receiver units have a four position DIP switch that is accessible from the front panel. Operation is as follows:

### Audio Configuration Switch Settings (Receiver Box)

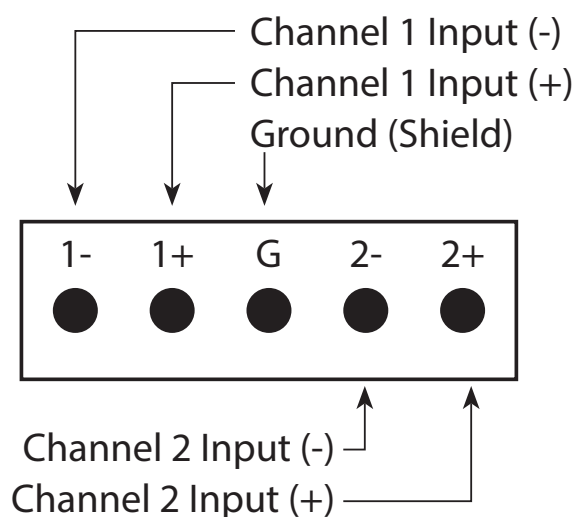
| Channel<br>(Switch Position) | Balanced  | Unbalanced  | Boost  | No Boost  |
|------------------------------|---|---|--|---|
| <b>Channel 1</b>             |  |  |  |  |
|                              | Switch 4 Up   | Switch 4 Down   | Switch 2 Down  | Switch 2 Up   |
| <b>Channel 2</b>             |  |  |  |  |
|                              | Switch 3 Up   | Switch 3 Down   | Switch 1 Down  | Switch 1 Up   |

### Audio Configuration Switch Settings (Receiver Card)

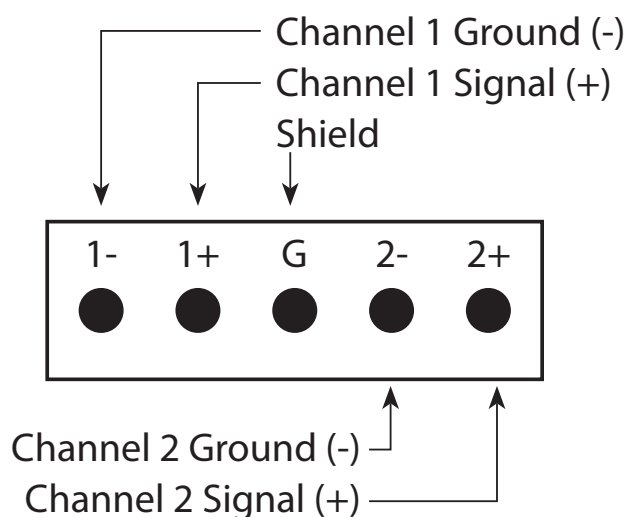
| Channel<br>(Switch Position) | Balanced  | Unbalanced  | Boost   | No Boost  |
|------------------------------|---|---|---|---|
| <b>Channel 1</b>             |  |  |  |  |
|                              | Switch 4 On   | Switch 4 Off  | Switch 2 Off  | Switch 2 On   |
| <b>Channel 2</b>             |  |  |  |  |
|                              | Switch 3 On   | Switch 3 Off  | Switch 1 Off  | Switch 1 On   |

## Audio Wiring - Transmitter

### Balanced

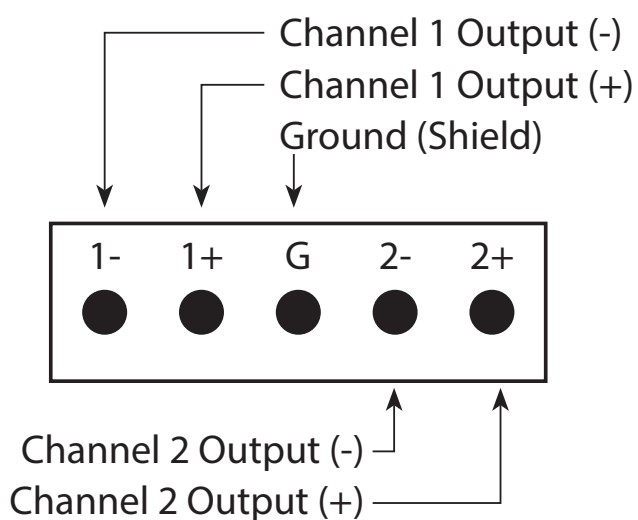


### Unbalanced

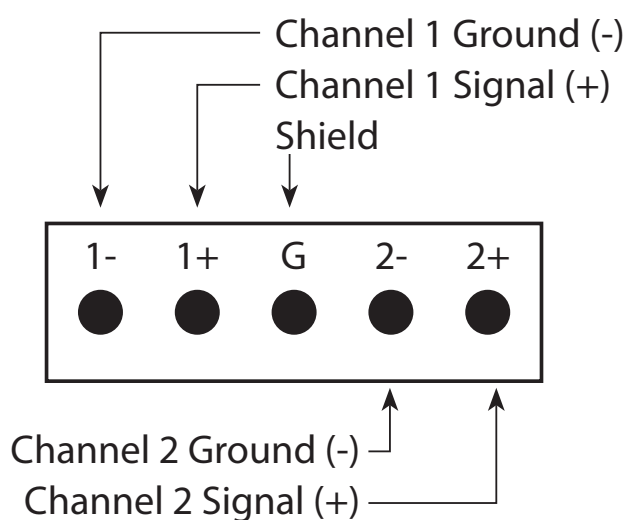


## Audio Wiring - Receiver

### Balanced



### Unbalanced



## Indicator LEDs

The FiberLink 3620A Series has several indicator LEDs that are used to monitor the state of the unit. Card versions have an additional Alarm LED.

| LEDs  |          |  |
|-------|----------|--|
| LED   | Status   | Definition                                     |
| Power | On       | Indicates that correct power has been applied. |
| Video | Off      | Indicates that no video is present             |
|       | On       | Indicates that video is present                |
| Audio | Off      | Indicates that no audio is present             |
|       | Blinking | Indicates that audio is present                |
| Alarm | On       | Loss of input video (card version only)        |



## Operating Pointers

Remember to check attenuation of the fiber optic cable. The system will only operate properly if these specifications fall within the range of the system's loss budget.

## Troubleshooting

Multimode fiber optic cable contains an optical fiber with a light carrying "core" that is only .0025 inches (62.5 microns) in diameter. Single mode fiber optic cable has an even smaller "core," only .00032 to .0004 inches (8-10 microns). This is smaller than a human hair! Therefore, any minute particles of dirt or dust can easily block the fiber from accepting or radiating light. To prevent this from happening, always use the provided dust caps when ever optical connectors are exposed to air. It is also a good idea to gently clean the tip of an optical connector with a lint-free cloth moistened with alcohol whenever dust is suspected.

The status of the LEDs should provide the first clue as to the origin of any operational failure. If these are off, it usually means that the fiber is broken or has too much attenuation.

Next, be certain that the input and output signal connections are correct.

An optical power meter, such as the FiberLink 6650, a visible light source, such as the FiberLink 6656, and a Three Wavelength Light Source, such as the FiberLink 6654, can greatly assist and expedite troubleshooting of fiber optic transmission systems and are recommended tools all installers should have available.

Finally, although multimode and single mode devices may look the same, they will not operate properly together. Using the wrong device or fiber can easily add more attenuation than specified, resulting in poor overall performance. It should be noted that some of our fiber optic products support both single mode and multimode fiber in the same unit.

If, after reviewing the above possibilities, the system is still not operating, please contact the Customer Service Department for further assistance. If you suspect your problem is caused by the optics or the fiber optic cable, and you have an optical power meter, please take the appropriate measurements prior to contacting support.

## Maintenance and Repairs

The FiberLink 3620A Series has been manufactured using the latest semiconductor devices and techniques that electronic technology has to offer. They have been designed for long, reliable and trouble-free service and are not normally field repairable.

Should difficulty be encountered, Artel Video Systems maintains a complete service facility to render accurate, timely and reliable service of all products.

The only maintenance that can be provided by the user is to ascertain that optical connectors are free of dust or dirt that could interfere with light transmission and that electrical connections are secure and accurate. Please see the Troubleshooting section of this manual for additional information.

An optical power meter, such as the FiberLink 6650, a visible light source, such as the FiberLink 6656, and a Three Wavelength Light Source, such as the FiberLink 6654, can greatly assist and expedite troubleshooting of fiber optic transmission systems and are recommended tools all installers should have available.

All other questions or comments should be directed to our Customer Service Department. It should be noted that many “problems” can easily be solved by a simple telephone call.

If you suspect your problem is caused by the optics or the fiber optic cable, and you have an optical power meter, please take the appropriate measurements prior to contacting support.

---

## Certifications



## 4.2 TFT Monitor

**TELEFUNKEN®**



# LCD TV

BEDIENUNGSANLEITUNG

INSTRUCTION MANUAL

MODE D'EMPLOI

ISTRUZIONI PER L'USO

A22F230A



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## ⚠ Safety Information



**CAUTION**  
RISK OF ELECTRIC SHOCK  
DO NOT OPEN



**CAUTION:** TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

**To operate your TV in extreme ambient conditions may cause the damage of the device.**



In extreme weather (storms, lightning) and long inactivity periods (going on holiday) disconnect the TV set from the mains. The mains plug is used to disconnect the TV set from the mains and therefore it must remain readily operable.





This sign is present wherever there is very important information regarding the operation and maintenance of the appliance in the literature accompanying it.






**Note:** Follow the on screen instructions for operating the related features.

## 📖 IMPORTANT - Please read these instructions fully before installing or operating

**⚠ WARNING: Never let people (including children) with reduced physical, sensory or mental capabilities or lack of experience and / or knowledge use electrical devices unsupervised.**

- For ventilation purposes, leave a free space of at least 10 cm all around the set.
- **Do not** block ventilation holes.
- **Do not** place the TV on sloping or unstable surfaces, the TV may tip over.
- Use this device in moderate climates.
- The power cord plug should be easily accessible. **Do not** place the TV, furniture, etc. on the power cord. A damaged power cord/plug can cause fire or give you an electric shock. Handle the power cord by the plug, **do not** unplug the TV by pulling the power cord. Never touch the power cord/plug with wet hands as this could cause a short circuit or electric shock. Never make a knot in the power cord or tie it with other cords. When damaged it must be replaced, this should only be done by qualified personnel.
- **Do not** use this TV in a humid or damp environment. Do not expose the TV to liquids. In case the cabinet contacts any liquids unplug the TV immediately and have it checked by qualified personnel before operating it any further.
- **Do not** expose the TV to direct sunlight, open flames or place it near intense heat sources such as electric heaters. 
- Listening in excessive volumes from earphones and headphones may cause hearing loss.
- Ensure that no open flame sources, such as lit candles, are placed on top of the TV. 
- To prevent injuries, this TV must be securely attached to a wall carefully by following the instructions (if the option is available).

- Occasionally, a few non-active pixels may appear on the screen as a fixed blue, green or red point. Please note that this does not affect the performance of your product. Take care not to scratch the screen with fingernails or other hard objects.
- Before cleaning, unplug the TV from the wall socket. Only use a soft, dry cloth while cleaning.

|  |                                |
|--|--------------------------------|
|  Warning                | Serious injury or death risk   |
|  Risk of electric shock | Dangerous voltage risk         |
|  Caution                | Injury or property damage risk |
|  Important              | Operating the system correctly |
|  Notice                 | Additional notes marked        |

## Markings on the Product

The following symbols are used **on the product** as a marker for restrictions and precautions and safety instructions. Each explanation shall be considered where the product bears related marking only. Note such information for security reasons.



**Class II Equipment:** This appliance is designed in such a way that it does not require a safety connection to electrical earth.



**Class II Equipment With Functional Earthing:** This appliance is designed in such a way that it does not require a safety connection to electrical earth, the earth connection is used for functional purposes.



**Protective Earth Connection:** The marked terminal is intended for connection of the protective earthing conductor associated with the supply wiring.



**Hazardous Live Terminal:** The marked terminal(s) is/are hazardous live under normal operating conditions.



**Caution, See Operating Instructions:** The marked area(s) contain(s) user replaceable coin or button cell batteries.



**Class 1 Laser Product:** This product contains Class 1 laser source that is safe under reasonably foreseeable conditions of

operation.

## WARNING

Do not ingest the battery, Chemical Burn Hazard

(The accessories supplied with or) This product may contain a coin/button cell battery. If the coin/button cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.

Keep new and used batteries away from children.

If the battery compartment does not close securely, stop using the product and keep it away from children.

If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

## WARNING

Never place a television set in an unstable location. A television set may fall, causing serious personal injury or death. Many injuries, particularly to children, can be avoided by taking simple precautions such as;

- Using cabinets or stands recommended by the manufacturer of the television set.
- Only using furniture that can safely support the television set.
- Ensuring the television set is not overhanging the edge of the supporting furniture.
- Not placing the television set on all furniture (for example, cupboards or bookcases) without anchoring both the furniture and the television set to a suitable support.
- Educating children about the dangers of climbing on furniture to reach the television set or its controls.

If your existing television set is being retained and relocated, the same considerations as above should be applied.

## Getting Started

### Notifications & Features & Accessories

#### Environmental Information

This television is designed to consume less energy to help save the environment. To reduce energy consumption, you should take the following steps:

If you set the Power Save Mode as **Eco**, the TV will switch to energy-saving mode. The Power Save Mode settings can be found in the 'Picture' section of the Main Menu. Note that some picture settings will be unavailable to be changed.

If **Picture Off** is selected, "Screen will be off in 3 seconds." message will be displayed. Select **PROCEED** and press **OK** to continue. The screen will be off immediately.

When the TV is not in use, please switch off or disconnect the TV from the mains plug. This will also reduce energy consumption.

#### Standby Notifications

1) If the TV does not receive any input signal (e.g. from an aerial or HDMI source) for 5 minutes, the TV will go into standby. When you next switch-on, the following message will be displayed: "**Standby Cause No Signal**" Press **OK** to continue.

2) If the TV has been left on and not been operated for a while, the TV will go into standby. When you next switch-on, the following message will be displayed. "**Standby Cause No Operation**" Press **OK** to continue.

#### Features

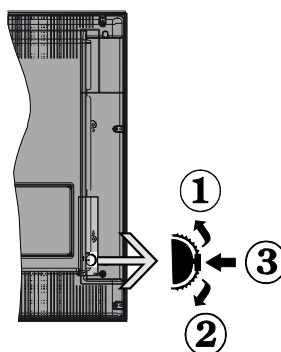
- Remote controlled colour LED TV.
- Fully integrated digital/cable/satellite TV (DVB-T/C/S2)
- HDMI inputs are for connecting a device that has a HDMI socket.
- USB input.
- OSD menu system.
- Scart socket for external devices (such as DVD Players, PVR, video games, etc.)
- Stereo sound system.
- Teletext.
- Headphone connection.
- Automatic programming system.
- Manual tuning.
- Automatic power down after up to six hours.
- Sleep timer.
- Child lock.
- Automatic sound mute when no transmission.
- NTSC playback.

- AVL (Automatic Volume Limiting).
- PLL (Frequency Search).
- PC input.
- Plug&Play for Windows 98, ME, 2000, XP, Vista, Windows 7.
- Game Mode (Optional).

#### Accessories Included

- Remote Control
- Batteries: 2 x AAA
- Instruction Book

#### TV Control Switch & Operation



1. Up direction
2. Down direction
3. Programme/Volume / AV / Standby-On selection switch

The Control button allows you to control the Volume/ Programme/ Source and Standby-On functions of the TV.

**To change volume:** Increase the volume by pushing the button up. Decrease the volume by pushing the button down.

**To change channel:** Press the middle of the button, the channel information banner will appear on screen. Scroll through the stored channels by pushing the button up or down

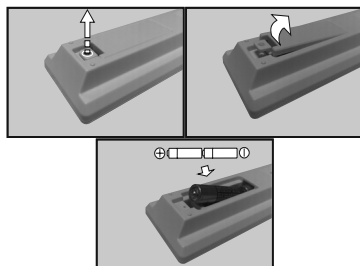
**To change source:** Press the middle of the button twice, the source list will appear on screen. Scroll through the available sources by pushing the button up or down.

**To turn the TV off:** Press the middle of the button down and hold it down for a few seconds, the TV will turn into standby mode.



### Inserting the Batteries into the Remote

Remove the screw that secure the battery compartment cover on the back side of the remote control first. Lift the cover gently. Insert two **AAA** batteries. Make sure the (+) and (-) signs match (observe correct polarity). Place the cover back on. Then screw the cover back on again.

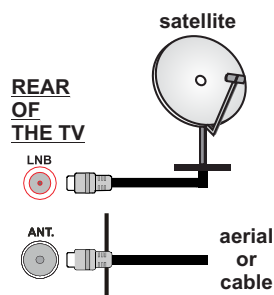


### Connect Power

**IMPORTANT:** The TV set is designed to operate on **220-240V AC, 50 Hz** socket. After unpacking, allow the TV set to reach the ambient room temperature before you connect the set to the mains. Plug the power cable to the mains socket outlet.

### Antenna Connection

Connect the aerial or cable TV plug to the AERIAL INPUT (ANT) socket or satellite plug to SATELLITE INPUT (LNB) socket located on the back of the TV.



### Notification

Manufactured under license from Dolby Laboratories.

### TRADEMARK ACKNOWLEDGMENT

"Dolby" and the double-D symbol are trademarks of Dolby Laboratories.



"HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC."

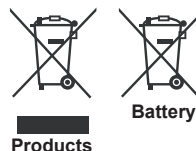


### Information for Users on Disposal of Old Equipment and Batteries

#### [European Union only]

These symbols indicate that equipment with these symbols should not be disposed of as general household waste. If you want to dispose of the product or battery, please consider the collection systems or facilities for appropriate recycling.

**Notice:** The sign Pb below the symbol for batteries indicates that this battery contains lead.



### Specification

|   |   |
|---|---|
| TV Broadcasting                               | PAL B/G D/K K I/I'                          |
| Receiving Channels                            | VHF (BAND I/III) - UHF (BAND U) - HYPERBAND |
| Number of Preset Channels                     | 10000                                       |
| Channel Indicator                             | On Screen Display                           |
| RF Aerial Input                               | 75 Ohm (unbalanced)                         |
| Operating Voltage                             | 220-240V AC, 50/60Hz.                       |
| Audio   | German+Nicam Stereo                         |
| Audio Output Power (WRMS.) (10% THD)          | 2 x 2,5 W                                   |
| Power Consumption                             | 45 W  |
| Weight  | 3,70 kg                                     |
| TV Dimensions DxLxH (with foot)               | 134 x 516 x 352 mm                          |
| TV Dimensions DxLxH (without foot)            | 55 x 516 x 317 mm                           |
| Operation temperature and operation humidity: | 0°C up to 40°C, 85% humidity max            |

### Teletext

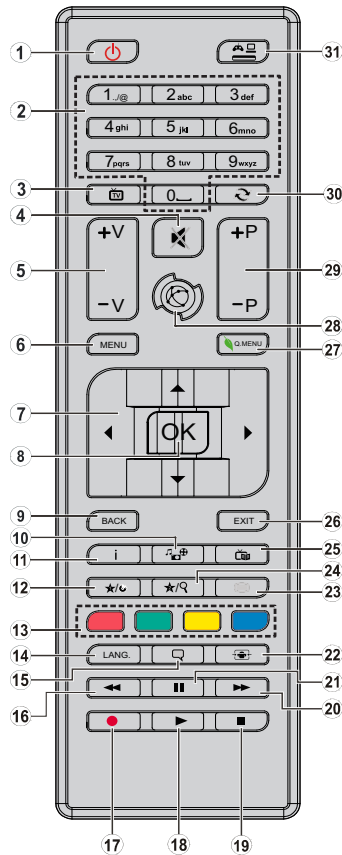
Press "⏏" button to enter. Press again to activate mix mode. Press once more to exit. Follow the instructions displayed on digital teletext screen.

### Digital Teletext (for UK only)

Press "⏏" button to view digital teletext information. Operate it with the coloured buttons, cursor buttons and the **OK** button. The operation method may differ depending on the contents of the digital teletext. Follow the instructions displayed on the digital teletext screen. When the "⏏" button is pressed again, the TV returns to television broadcast.

## Getting Started

### Remote Control



#### MY BUTTON 1

Press MY BUTTON 1 for five seconds when on a desired source, channel or link, until the "MY BUTTON IS SET" message is displayed on the screen. This confirms that the selected MY BUTTON is now associated with the selected function.

#### MY BUTTON 2







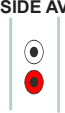
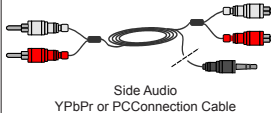







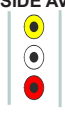






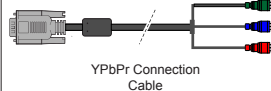




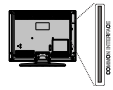


This button's main function is to switch between DVB-T, DVB-C and DVB-S broadcasts. However, if you press MY BUTTON 2 for five seconds, you can set a function to it as described in My Button 1.


Note that if you perform first time installation, MY BUTTON 2 will return to its default function, switching between DVB-T, DVB-C and DVB-S broadcasts.

1. **Standby:** On / Off switch of the TV
2. **Numeric buttons:** Used to navigate channels and enter passwords, text etc.
3. **TV:** Displays channel list / Switches among broadcast types
4. **Mute:** Completely turns off the volume of the TV
5. **Volume +/-**
6. **Menu:** Displays TV menu
7. **Navigation buttons:** Helps navigate menus, content etc. and displays the subpages in TXT mode when pressed Right
8. **OK:** Confirms user selections, holds the page (in TXT mode), views channel list (DTV mode)
9. **Back:** Returns to previous screen, opens index page (in TXT mode)
10. **Media browser:** Opens the media browsing screen
11. **Info:** Displays information about on-screen content, shows hidden information (reveal - in TXT mode)
12. **My button 1 (\*)**
13. **Coloured Buttons**
14. **Language:** Switches between sound modes (analogue TV), displays and changes audio/subtitle language (where available)(digital TV)
15. **Subtitles:** Turns subtitles on and off (where available)
16. **Rapid reverse:** Moves frames backwards in media such as movies
17. **No function**
18. **Play:** Starts to play selected media
19. **Stop:** Stops the media being played
20. **Rapid advance:** Moves frames forward in media such as movies
21. **Pause:** Pauses the media being played
22. **Screen:** Changes the aspect ratio of the screen
23. **Text:** Displays teletext (where available), press again to superimpose the teletext over a normal broadcast picture (mix)
24. **My button 2 (\*)**
25. **EPG (Electronic programme guide):** Displays the electronic programme guide
26. **Exit:** Closes and exits from displayed menus or returns to previous screen
27. **Quick Menu:** Displays a list of menus for quick access
28. **No function**
29. **Programme +/-**
30. **Swap:** Quickly cycles between previous and current channels
31. **Source:** Shows all available broadcast and content sources

## Getting Started

### Connections

| Connector  | Type                                    | Cables   | Device   |
|--|---|--|--|
|                 | Scart Connection (back)                 |   |    |
|                 | VGA Connection (back)                   |   |    |
|                 | PC/YPbPr Audio Connection (side)        | <br>Side Audio YPbPr or PC Connection Cable |    |
|                 | HDMI Connection (back)                  |   |    |
| <br>Coaxial Out | Coaxial Out Connection (back)           |   |    |
|                 | Side AV (Audio/Video) Connection (side) |   |    |
| <br>HEADPHONE  | Headphone Connection (side)             |   |  |
| <br>YPBPR     | YPbPr Video Connection (side)           | <br>YPbPr Connection Cable                |  |
| <br>USB       | USB Connection (side)                   |   |  |
| <br>CI        | CI Connection (side)                    |   |  |

 **NOTE:** When connecting a device via the Side AV input, you must use a connection cable to enable connection. See the illustrations above. To enable PC audio, you will need to use the SIDE AV CONNECTION cable's WHITE & RED inputs. If an external device is connected via the SCART socket, the TV will automatically switch to AV mode. When receiving DTV channels (Mpeg4 H.264) or while in Media Browser mode, output will not be available via the scart socket. When using the wall mounting kit (optional), we recommend that you plug all your cables into the back of the TV before mounting on the wall. Insert or remove the CI module only when the TV is SWITCHED OFF. You should refer to the module instruction manual for details of the settings.

## Getting Started

### First Time Installation - USB Connections

#### Switching On/Off

##### To Switch the TV On

Connect the power cord to the 220-240V AC, 50/60Hz.

To switch on the TV from standby mode either:

Press the "⏻" button, **P+** / **P-** or a numeric button on the remote control.

Press the side function switch until the TV comes on from standby.

##### To Switch the TV Off

Press the "⏻" button on the remote control or press the side function switch until the TV switches into standby mode.

**To power down the TV completely, unplug the power cord from the mains socket.**

*Note: When the TV is switched to standby mode, the standby LED can blink to indicate that features such as Standby Search, Over Air Download or Timer is active. The LED can also blink when you switch on the TV from standby mode.*

#### First Time Installation

When turned on for the first time, the language selection screen is displayed. Select the desired language and press OK.

The First Time Installation (FTI) screen will be displayed next. Set your preferences using the navigation buttons and when finished, press OK to continue.

You can activate **Store mode** option to be available in "Other settings" menu and your TV's features will be illustrated on the top of the screen. A confirmation screen will be displayed. Select **YES** to proceed.

If Home Mode is selected, Store mode will not be available after the First Time Installation. Press **OK** button to continue.

##### Aerial Installation

If you select **AERIAL** option from the **Search Type** screen, the television will search for digital terrestrial TV broadcasts.

 **NOTE:** You can press **MENU** button to cancel.

After all the available stations are stored, the Channel List will be displayed on the screen. If you like how the channels are sorted according to the LCN (\*), please select "Yes" and then press **OK**.

Press **MENU** button to quit channel list and watch TV.

(\* ) LCN is the Logical Channel Number system that organizes available broadcasts in accordance with a recognizable channel sequence (if available).

#### Cable Installation

If you select **CABLE** option and press OK button on the remote control. To continue, please select YES and press OK. To cancel operation, select NO and press OK. You can select frequency ranges from this screen.

Enter the frequency range manually by using the numeric button.

**Note:** Searching duration will change depending on the selected search step.

#### Satellite Installation

If you select **Satellite** option from the **Search Type** screen, you can set a satellite and watch the satellite channels. When you select Satellite installation, **Antenna Type** menu will be displayed.

There are three types of antenna selection. You can select **Antenna type** as **Direct**, **Unicable** or **DiSEqC** switch by using "◀" or "▶" buttons.

**Direct:** If you have a single receiver and a direct satellite dish, select this antenna type. After selecting **Direct**, another menu screen will be displayed. Select an available satellite and press **OK** to scan for services.

**Unicable:** If you have multiple receivers and a unicable system, select this antenna type. Press **OK** to continue. Configure settings by following instructions on the screen. Press **OK** to scan for services.

**DiSEqC switch:** If you have multiple satellite dishes and a **DiSEqC switch**, select this antenna type. After selecting DiSEqC switch, another menu screen will be displayed. You can set four **DiSEqC** options (if available). Press **GREEN** button to scan all satellites or press **YELLOW** button to scan only the highlighted satellite. To save and exit press **OK** button.

If you select a DiSEqC option, Search Type screen will be displayed. Select an option and continue.

The following options will be available:

Start Regular Search: Performs a full-band search.

Search Astra Service List: Performs the search in accordance with the Astra Service List.

Pre-Programmed List: Performs the search in accordance with the preset channel list.

### Media Playback via USB Input






*You can connect a 2.5" and 3.5" inch (hdd with external power supply) external hard disk drives or USB memory stick to your TV by using the USB inputs of the TV.*

**IMPORTANT!** Back up your files before making any connections to the TV. Manufacturer will not be responsible for any file damage or data loss. Certain types of USB devices (e.g. MP3 Players) or USB hard disk drives/memory sticks may not be compatible with this TV. The TV supports FAT32 and NTFS disk formatting.

While formatting a USB hard disk that has 1TB (Tera Byte) or more file capacity, you can experience problems with the formatting process. Do not repeatedly quickly plug and unplug the drive. This may cause physical damage to the USB player and USB device itself. Do not pull out USB module while playing a file.

### Media Browser Menu

You can play photo, music, and movie files stored on a USB disk by connecting it to your TV. Connect a USB disk to one of the USB inputs located on the side of the TV. Pressing the **MENU** button while in the Media Browser mode will access the Picture, Sound and Settings menu options. Pressing the **MENU** button again will exit from this screen. You can set your Media Browser preferences by using the Settings Menu.

| Loop/Shuffle Mode Operation  |  |
|--|--|
| Start playback with  and activate                  | TV plays next file and loop the list.            |
| Start playback with <b>OK</b> and activate    | The same file will be played in a loop (repeat). |
| Start playback with <b>OK</b> /  and activate  | The file will be played in a shuffle.            |

### Quick Menu

Quick Settings menu allows you to access some options quickly. This menu includes Power Save Mode, Picture Mode, Favourites and Sleep Timer options. Press **Q.MENU** button on the remote control to view quick menu. See the following chapters for the details of the listed features.

| TV Menu Features and Functions  |   |
|---|---|
| Picture Menu Contents   |   |
| <b>Mode</b>   | You can change the picture mode to suit your preference or requirements. Picture mode can be set to one of these options: <b>Cinema,Game,Dynamic</b> and <b>Natural</b> .   |
| <b>Contrast</b>   | Sets the lightness and darkness values of the screen.   |
| <b>Brightness</b>   | Sets the brightness value for the screen.   |
| <b>Sharpness</b>  | Sets the sharpness value for the objects displayed on the screen.   |
| <b>Colour</b>   | Sets the colour value, adjusting the colors.  |
| <b>Power Save Mode</b>  | To set the Power Save Mode as Eco, Picture Off and Disabled.<br>(When the Mode is Dynamic, Power Save mode is automatically set as disabled.)   |
| <b>Backlight (Optional)</b>   | This setting controls the backlight level. The backlight function will be inactive if the Power Save Mode is set to Eco. The backlight cannot be activated in VGA, Media Browser mode or while the picture mode is set to Game. |
| <b>Noise Reduction</b>  | If the broadcast signal is weak and the picture is noisy, use the <b>Noise Reduction</b> setting to reduce the amount of noise.   |
| Advanced Settings   |   |
| <b>Dyanmic Contrast</b>   | You can change the Dynamic Contrast ratio to desired value.   |
| <b>Colour Temp</b>  | Sets the desired colour tone.   |
| <b>Picture Zoom</b>   | Sets the desired picture size from picture zoom menu.<br><i>Note: Auto (Only available in Scart mode with SCART PIN8 high voltage/low voltage switching)</i>  |
| <b>Film Mode</b>  | Films are recorded at a different number of frames per second to normal television programmes. Turn this feature on when you are watching films to see the fast motion scenes clearly.  |
| <b>Skin Tone</b>  | Skin tone can be changed between -5 and 5.  |
| <b>Colour Shift</b>   | Adjusts the desired colour tone.  |
| <b>RGB Gain</b>   | You can configure the colour temperature values using the RGB Gain feature.   |
| <b>Reset</b>  | Resets the picture settings to factory default settings.(Except Game Mode)  |
| <b>Autoposition (in PC mode)</b>  | Automatically optimizes the display. Press OK to optimize.  |
| <b>H Position (in PC mode)</b>  | This item shifts the image horizontally to the right hand side or left hand side of the screen.   |
| <b>V Position (in PC mode)</b>  | This item shifts the image vertically towards the top or bottom of the screen.  |
| <b>Dot Clock (in PC mode)</b>   | Dot Clock adjustments correct the interference that appear as vertical banding in dot intensive presentations like spreadsheets or paragraphs or text in smaller fonts.   |
| <b>Phase (in PC mode)</b>   | Depending on the resolution and scan frequency that you input to the TV set, you may see a hazy or noisy picture on the screen. In such a case you can use this item to get a clear picture by trial and error method.          |
| <i>While in VGA (PC) mode, some items in Picture menu will be unavailable. Instead, VGA mode settings will be added to the Picture Settings while in PC mode.</i> |   |

| Sound Menu Contents   |   |
|---|---|
| <b>Volume</b>   | Adjusts the volume level.   |
| <b>Equalizer</b>  | Selects the equalizer mode. Custom settings can be made only when in user mode.   |
| <b>Balance</b>  | This setting is used for emphasizing left or right speaker balance.   |
| <b>Headphone</b>  | Sets headphone volume.  |
| <b>Sound Mode</b>   | You can select a sound mode. (If the selected channel supports).  |
| <b>AVL (Automatic Volume Limiting)</b>                        | Function sets the sound to obtain fixed output level between programmes.  |
| <b>Digital Out</b>  | Sets digital out audio type.  |
| Settings Menu Contents  |   |
| <b>Conditional Access</b>                                     | Controls conditional access modules when available.   |
| <b>Language</b>   | Configures language settings (may change depending on the country selected) Preferred and current settings will be available. Current settings can be changed only if the broadcaster supports.   |
| <b>Parental</b>   | Enter correct password to change parental settings. You can easily adjust menu lock, maturity lock(may change depending on the country selected) and child lock in this menu. You can also set new pin number.  |
| <b>Timers</b>   | Sets sleep timer to turn off the TV after a certain time. Sets timers for selected programmes. (USB Record)   |
| <b>Date/Time</b>  | Sets date and time.   |
| <b>Sources</b>  | Enables or disables selected source options.  |
| <b>Satellite Settings</b>                                     | Displays the satellite settings.  |
| Other Settings: Displays other setting options of the TV set: |   |
| <b>Menu Timeout</b>   | Changes timeout duration for menu screens.  |
| <b>Scan Encrypted Channels</b>                                | When this setting is on, the search process will locate the encrypted channels as well.   |
| <b>Blue Background</b>  | Activates or deactivates the blue background system when the signal is weak or absent.  |
| <b>Software Upgrade</b>                                       | To ensure that your TV always has the most up to date firmware.   |
| <b>Application Version</b>                                    | Displays application version.   |
| <b>Hard of Hearing</b>  | Enables any special feature sent from the broadcaster.  |
| <b>Audio Description</b>                                      | Audio description refers to an additional narration track for blind and visually impaired viewers of visual media, including television and movies. You can use this feature, only if the broadcaster supports that additional narration track.<br>Note: Audio description sound feature cannot be available in recording or time shifting mode.. |
| <b>Auto TV Off</b>  | You can set the timeout value of auto off feature. When the timeout value is reached and the TV has not been operated for a selected time, the TV will go into standby mode.  |
| <b>Standby Search (Optional)</b>                              | If the Standby Search is set to On, when the TV is in standby mode, available broadcasts will be searched. If the TV locates any new or missing broadcasts, a menu screen will be displayed, asking you whether or not to execute these changes. Channel list will be updated and changed after this process.                                     |



|   |  |
|---|--|
| <b>Store Mode</b>                                     | If you are displaying the TV in a store, you can activate this mode. Whilst Store Mode is enabled, some items in the TV menu may not be available.   |
| <b>Power Up Mode</b>                                  | This setting configures the power up mode preference.  |
| <b>Biss Key</b>                                       | Biss is a satellite signal scrambling system that is used for some broadcasts. If you need to enter BISS key on a broadcast, you can use Biss Key setting located in the Other Settings menu. Highlight Biss Key and press OK to enter keys on the desired broadcast.  |
| <b>Install and Retune Menu Contents</b>               |  |
| <b>Automatic Channel Scan (Retune) (If available)</b> | <p><i>Displays automatic tuning options.</i></p> <p><b>Digital Aerial:</b> Searches and stores aerial DVB stations.</p> <p><b>Digital Cable:</b> Searches and stores cable DVB stations.</p> <p><b>Analogue:</b> Searches and stores analogue stations.</p> <p><b>Digital Aerial &amp; Analogue:</b> Searches and stores aerial DVB and analogue stations.</p> <p><b>Digital Cable &amp; Analogue:</b> Searches and stores cable DVB and analogue stations.</p> <p><b>Satellite:</b> Searches and stores satellite stations.</p> |
| <b>Manual Channel Scan</b>                            | This feature can be used for direct broadcast entry.   |
| <b>Network Channel Scan</b>                           | Searches for the linked channels in the broadcast system.  |
| <b>Analogue Fine Tune</b>                             | You can use this setting for fine tuning analogue channels. This feature is not available if no analogue channels are stored.  |
| <b>First Time Installation</b>                        | Deletes all stored channels and settings, resets TV to factory settings.   |

## General TV Operation

### Using the Channel List

The TV sorts all stored stations in the Channel List. You can edit this channel list, set favourites or set active stations to be listed by using the Channel List options.

### Configuring Parental Settings

*To prohibit viewing of certain programmes, channels and menus can be locked by using the parental control system.*

To display parental lock menu options, the PIN number should be entered. The factory default PIN number is **0000**. After coding the correct PIN number, parental settings menu will be displayed.

**Menu Lock:** Menu lock setting enables or disables the menu access.


**Maturity Lock:** When set, this option gets the maturity information from the broadcast and if this maturity level is disabled, disables access to the broadcast.

**Child Lock:** When Child Lock is set, the TV can only be controlled by the remote control. In this case the control panel buttons will not work.

**Set PIN:** Defines a new PIN number.

**Note:** If the Country option is set to France, you can use 4725 as the default code.

### Electronic Programme Guide (EPG)



Some, but not all channels send information about the current and next programmes. Press the  button to view the EPG menu.

**Red button (Prev Day):** Displays the programmes of previous day.

**Green button (Next day):** Displays the programmes of the next day.

**Yellow button (Zoom):** Expands programme information.

**Blue button (Filter):** Views filtering options.

 : Press "" button to view Select Genre menu. Using this feature, you can search the programme guide database in accordance with the genre. Info available in the programme guide will be searched and results matching your criteria will be listed.

**(i) INFO:** Displays, in detailed, information on the programme selected.

**Numeric buttons (Jump):** Jumps to the preferred channel directly via numeric buttons.

**OK:** Displays programme options.

**Text (Search):** Displays "**Guide Search**" menu.

 **(Now)** : Shows the current programme.

**P+P-** : More event info

**IMPORTANT:** Connect a USB disk to your TV while the TV is switched off. You should then switch on the TV to enable the recording feature.

**Note:** Switching to a different broadcast or source is not available during a recording.

### Programme Options

In **EPG** menu, press the **OK** button to enter the **Event Options** menu.

#### Select Channel

In **EPG** menu, using this option, you can switch to the selected channel.

#### Set Timer / Delete Timer

After you have selected a programme in the **EPG** menu, press the **OK** button. Select the **Set Timer on Event** option and press the **OK** button. You can set a timer for future programmes. To cancel an already set timer, highlight that programme and press the **OK** button. Then select "**Delete Timer**" option. The timer will be cancelled.

### Software Upgrade

Your TV is capable of finding and updating automatically via the Aerial/Cable/Satellite signal.

#### Software upgrade search via user interface

Simply navigate on your main menu. Choose **Settings** and select **Other Settings** menu. In **Other Settings** menu navigate on to the **Software for Upgrade** item and press **OK** button to check for a new software upgrade.

#### 3 AM search and upgrade mode

While the TV is connected to an aerial signal. If Automatic scanning in the Upgrade Options menu is enabled, the TV wakes up at 03:00 and searches broadcast channels for new software upgrades. If new software is found and downloaded successfully, the next time the TV powers up, it will have the new software version.

**Note:** If the TV fails to come on after the upgrade unplug the TV for 2 minutes and plug in again.

### Troubleshooting & Tips

#### Tv will not turn on

Make sure the power cord is plugged in securely to wall outlet. The batteries in the remote control may be exhausted. Press the Power button on the TV.

#### Poor picture

- Have you selected the correct TV system?
- Low signal level can cause picture distortion. Please check antenna access.
- Check if you have entered the correct channel frequency if you have done manual tuning.

- The picture quality may degrade when two devices are connected to the TV at the same time. In such a case, disconnect one of the devices.

#### No picture

- No Picture means that your TV is not receiving a transmission. Have you selected the correct button on the remote control? Try once more. Also make sure the correct input source has been selected.
- Is the antenna connected properly?
- Is the antenna cable damaged?
- Are suitable plugs used to connect the antenna?
- If you are in doubt, consult your dealer.

#### No sound

- Has the TV been set to mute? To cancel mute, press the "**X**" button, or increase the volume level.
- Sound is coming from only one speaker. Is the balance set to one extreme? See Sound Menu section.

#### Remote control - does not operate

- The batteries may be exhausted. Replace the batteries.

#### Input sources - can not be selected

- If you cannot select an input source, it is possible that no device is connected. if not
- Check the AV cables and connections if you have tried to connect a device.

### PC Input Typical Display Modes

The following table is an illustration of some of the typical video display modes. Your TV may not support all resolutions. Your TV supports up to 1920x1080.

| Index | Resolution | Frequency |
|-------|------------|-----------|
| 1     | 1024x768   | 60 Hz     |
| 2     | 1280x768   | 60 Hz     |
| 3     | 1360x768   | 60 Hz     |
| 4     | 800x600    | 56 Hz     |
| 5     | 800x600    | 60 Hz     |
| 6     | 1024x768   | 66 Hz     |
| 7     | 1280x960   | 60 Hz     |
| 8     | 1280x1024  | 60 Hz     |
| 9     | 1400x1050  | 60 Hz     |
| 10    | 1600x1200  | 60 Hz     |
| 11    | 1920x1080  | 60 Hz     |

### AV and HDMI Signal Compatibility

| Source         | Supported Signals |                                   | Available |
|----------------|-------------------|-----------------------------------|-----------|
| EXT<br>(SCART) | PAL 50/60         |                                   | O         |
|                | NTSC 60           |                                   | O         |
|                | RGB 50            |                                   | O         |
|                | RGB 60            |                                   | O         |
| Side AV        | PAL 50/60         |                                   | O         |
|                | NTSC 60           |                                   | O         |
| PC/<br>YPbPr   | 480I, 480P        | 60Hz                              | O         |
|                | 576I, 576P        | 50Hz                              | O         |
|                | 720P              | 50Hz,60Hz                         | O         |
|                | 1080I             | 50Hz,60Hz                         | O         |
|                | 1080P             | 50Hz,60Hz                         | O         |
| HDMI           | 480I              | 60Hz                              | O         |
|                | 480P              | 60Hz                              | O         |
|                | 576I, 576P        | 50Hz                              | O         |
|                | 720P              | 50Hz,60Hz                         | O         |
|                | 1080I             | 50Hz,60Hz                         | O         |
|                | 1080P             | 24Hz, 25Hz<br>30Hz, 50Hz,<br>60Hz | O         |

(X: Not Available, O: Available)

In some cases a signal on the LED TV may not be displayed properly. The problem may be an inconsistency with standards from the source equipment (DVD, Set-top box, etc.). If you do experience such a problem please contact your dealer and also the manufacturer of the source equipment.

### Supported File Formats for USB Mode

| Media    | File Extension | Format                    |                | Remarks<br>(Maximum resolution/Bit rate etc.)  |
|----------|----------------|---------------------------|----------------|--|
|          |                | Video                     | Audio          |  |
| Movie    | mpg, mpeg      | MPEG1, MPEG2              |                | MPEG1: 768x576 @30P<br>MPEG2: 1920x1080 @ 30P  |
|          | vob            | MPEG2                     |                | 1920x1080 @ 30P  |
|          | mp4            | MPEG4, Xvid, H.264        |                |  |
|          | mkv            | H.264, MPEG4, VC-1        |                |  |
|          | avi            | MPEG2, MPEG4, Xvid, H.264 |                |  |
|          | flv            | H.264/VP6/Sorenson        |                | H.264/VP6: 1920x1080 @ 30P<br>Sorenson: 352x288 @30P   |
|          | 3gp            | MPEG4, H.264              |                | 1920x1080 @ 30P  |
| Music    | .mp3           | -                         | MPEG 1 Layer 2 | 32Kbps ~ 448Kbps(Bit rate)<br>32K, 44.1k, 48k Hz, 16K, 22.05K, 24K Hz (Sampling rate)                      |
|          |                |                           | MPEG 1 Layer 3 | 32Kbps ~ 320Kbps(Bit rate)<br>32K, 44.1k, 48k Hz, 16K, 22.05K, 24K Hz, 8K, 11.025K, 12K Hz (Sampling rate) |
| Photo    | .jpg .jpeg     | Baseline JPEG             | -              | max WxH = 17000x10000 4147200bytes   |
|          | .              | Progressive JPEG          | -              | max WxH = 4000x4000 3840000bytes   |
|          | .bmp           | -                         | -              | max WxH = 5760x4096 3840000bytes   |
| Subtitle | .sub .srt      | -                         | -              | -  |