ScatterBox

.. distributes signals

▢ MOD200 User Manual ▢

HD Modulator

▢ **View CCTV as Digital TV Channel** ▢ **Full 1080p HD**

▢ **HDMI Input with Pass-thru** ▢ **Backlit LCD Display**

Introduction

Most homes still use coaxial cable as a way to distribute TV signals from the aerial to the various TVs within the property. The new MOD200 modulator allows you to make the best out of this set up and use it to distribute your home CCTV through this same coaxial cable network.

It works by allowing the HDMI output of a DVR (or other equipment such as a Satellite box) to be converted into a digital RF signal or "Digital TV channel" so you can distribute it around a home and watch it on any TV just like it was a real digital TV channel.

The MOD200 produces a high quality 1080p picture far superior to an analogue modulated signal and as all new TVs contain a digital tuner it's a great way to distribute CCTV in a home or a commercial building via coaxial cable.

The HDMI input to the MOD200 also carries sound alongside the video, so any connected TVs will also be able to playback sound from the DVR or other device too.

The MOD200 is also extremely useful for distributing the output from DVRs to multiple "TVs" in commercial environments such as pubs or clubs as it can all be done over low cost coax using an off-the-shelf RF distributor.

User Information

❑ The modulator must be installed in a clean, dry environment where it will not be exposed to high temperatures, moisture or excessive dust.

❑ Do not touch the modulator or any of its connections with wet hands.

❑ Ensure the power is switched off if the modulator is not in use for a long period of time.

❑ There are no user serviceable parts in the modulator and opening or attempting to repair the product will void the warranty.

❑ Only use the PSU originally supplied with the product.

❑ Do not install or use the device if the power cable is damaged.

❑ Ensure the power to the modulator is switched off when connecting or removing cables.

Note: The MOD200 has to process and digitise the HDMI input from the DVR and this creates a small delay or "latency" in its output, this is typically in the region of 200 milliseconds. This means the TV picture would be around 1/5 second behind what the DVR's output is doing. It's very similar to the latency you get with IP cameras systems.

Contents & Accessories

Accessories Included

To make the installation as easy as possible the MOD200 is supplied with PSU and RF Terminator.

Power Supply

So that the modulator is ready to use right out of the box we supply a 12V DC / 1A plug-in PSU with a 1.35mm DC connection.
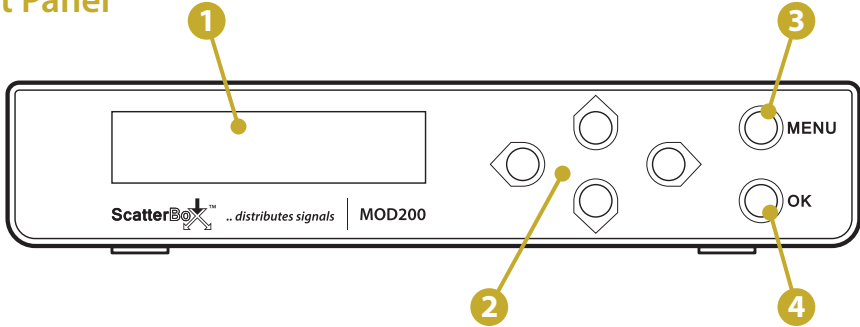
RF Terminator

75Ω RF terminator for capping off the RF input when not in use.

Connections & Controls

Front Panel

| No.	Feature	Function
1	LCD Display	Backlit display shows video information, menu options and parameters. After a few seconds of inactivity the MOD200 will enter power saving mode and the backlight will turn off automatically.
2	Navigation Buttons	Used to navigate through the menu system and change parameters.
3	Menu Button	Press to display or exit the menu system.
4	OK Button	Used to select menu options and confirm changes.

Connections
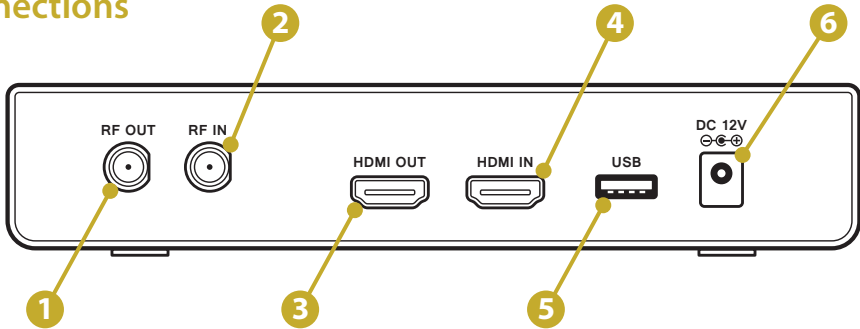
No.	Feature	Function
1	RF Output	F-type socket used to output the modulated signal.
2	RF Input	F-type socket for connecting TV aerial or when cascading from another MOD200. (*Must be terminated with supplied 75Ω RF terminator if not in use*)
3	HDMI Out	HDMI pass-thru for viewing HDMi input on local monitor or other equipment.
4	HDMI In	HDMI input from source e.g. DVR, Sky box.
5	USB Socket	For updating the firmware on the unit.
6	Power Socket	1.35mm DC Socket for connecting 12V DC PSUs. *(Supplied)*

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Installation - Single Unit

Below is a typical example of how the MOD200 may be installed into a residential property or smaller retail and commercial environments. If you are installing into a system which uses a "Masthead" amplifier see page 7 on how this is achieved.
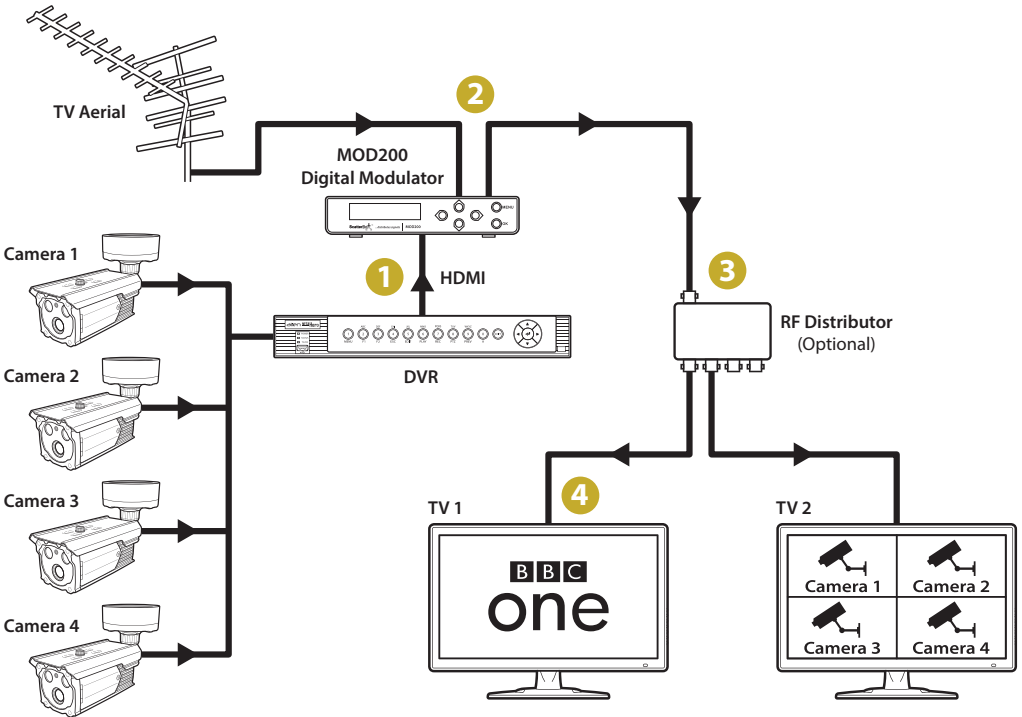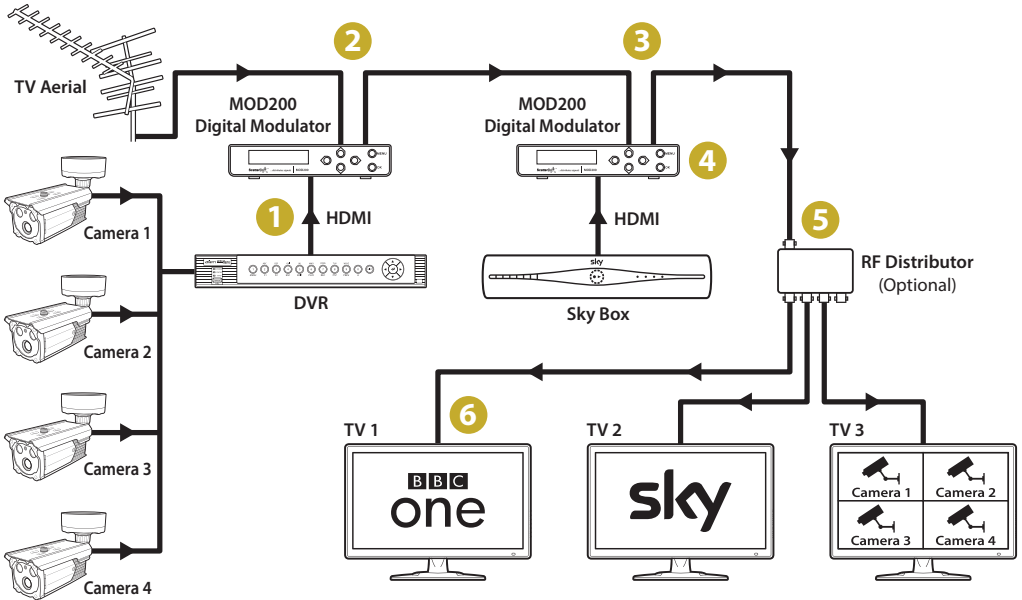

1   Connect the DVR (or other video equipment) to the HDMI input of the MOD200.

2   The MOD200 merges the TV aerial signal via the RF input with the modulated HDMI signal from the DVR to produce a combined RF output.

3   Optional - Use an RF distributor to view the CCTV images on multiple TVs throughout the property.

4   The final step is to re-tune all the TVs to discover and view the video images as digital TV channels. These channels are identified by their LCN number.

Note: *If you are using a Masthead amplifier the installation is slightly different. Information and example of this can be seen on page 7.*

Installation - Multiple Units

On larger commercial or retail installs such as bars, shopping centres and hotels you could connect multiple units together to enable a number devices to be viewed as separate digital TV channels. This could be used to distribute sports channels around a pub or information channels to hotel rooms. **Up to five MOD200s can be connected** using the method shown below.

1   Connect the DVR (or other video equipment) to HDMI input of the first MOD200.

2   The first MOD200 merges the TV aerial signal via the RF input with the modulated HDMI signal from the DVR to produce a combined RF output.

3   The second MOD200 merges combined TV aerial and DVR signal via the RF input with the modulated HDMI signal from the Sky box to produce a new combined RF output.

4   Every time you add an additional MOD200 you will need to change its LCN and Channel Number (Frequency) so they are all uniquely identified.

5   Optional - Use an RF distributor to view the images on multiple TVs.

6   The final step is to re-tune all the TVs to discover and view the video images as digital TV channels. These channels are identified by their LCN number.

Note: *If you are using a Masthead amplifier the installation is slightly different. Information and example of this can be seen on page 7.*

Installation - Using A Masthead Amp

Although the MOD200 has a built-in combiner you may encounter problems when using a "Masthead" amplifier which is powered remotely up the co-ax, as the MOD200's internal combiner will not pass this power. We recommend that you use an external DC combiner which will pass DC power to the "Masthead" amplifier.

If the "Masthead" amplifier is being powered locally then the DC combiner will not be necessary.

If the amplifier has its own up the co-ax PSU then this can be inserted between the amplifier and the RF IN of the first MOD200.

The example below shows how you would connect single or multiple MOD200s when using a "Masthead" amplifier which is powered remotely up the co-ax.
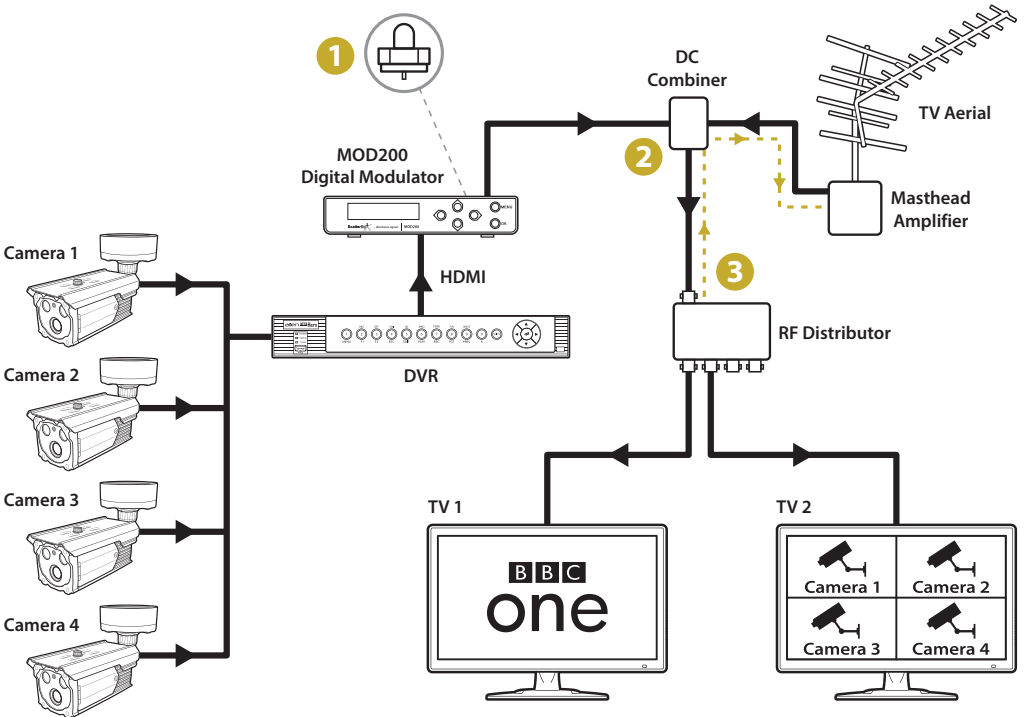
1   **Fit the supplied 75Ω RF terminator to the unused RF input on the first MOD200.**

2   **The external DC combiner merges the modulators output with the TV aerials output.**

3   **The RF distributor provides power up the co-ax through the DC combiner to the Masthead amplifier.**

Menu System

The MOD200 has been designed for use in the UK. Therefore the default parameters are already set to the UK standard and the MOD200 should be ready to go. There are a few scenarios where you may need to change settings like if you are using multiple MOD200s and the default channel is already in use or the channel name is not relevant.

If you do need to change settings there are only a few parameters that actually need changing and these are highlighted in gold in the menu table on the opposite page. They're also listed in more detail on page 10.

Navigating The Menu System & Modifying Parameters

The MOD200 features an easy to use menu system for setting up and managing the unit itself and the new digital TV channels. The push buttons on the front panel of the MOD200 are used for navigation and configuring adjustments.

Note: *When entering the menu system you will be asked to input a password. The default password is **0000** so you can simply press '**OK**'.*

Button(s)	Function
	Move to the next or previous menu screen / Move to the next or previous digit/character
	Increase or decrease the selected parameter or digit/character
MENU	**Enter menu system / Return to previous menu screen / Exit menu system** *(If changes have been made you will be asked if you want to apply changes when exiting)*
OK	**Select item / Confirm selection**

Acronyms

The handy tables below lists the acronyms used in the menu system and broadcasting equipment along with what they stand for.

Acronym	Meaning	Title In Menu System
FEC	Forward Error Correction	Code Rate
FFT	Fast Fourier Transform	FFT Carrier
LCN	Logical Channel Number	LCN
NIT	Network Information Table	NIT Version
ONID	Original Network ID	Original Net
TSID	Transport Stream ID	TS ID

Menu System

Main Menu	Parameter	Default Value	Function
Network Setting	Country	UK	Set region in which the MOD200 will be used.
	Original Net	9018	The unique ID of the network who originally broadcast the stream. In the UK this must be set to 9018.
	Network ID	12289	The unique ID of the network who is currently broadcasting the stream e.g. BSkyB
	Network Name	Private Network	Set the name of the network if desired.
	TS ID	128	Choose a specific transport stream from the broadcasting network.
	NIT Version	28	Allows users to manually set the NIT version.
CH & Enc Setting	Service Name	AlienDVR	Set the name for the channel as you want it to appear in the channel list on the TV.
	Provider Name	AlienDVR	Gives the option to manually enter the name of the provider. e.g. BBC, BSkyB.
	Service ID	1	Allows users to manually set the NIT version.
	LCN	800	Set what digital TV channel number the MOD200 is assigned to.
	Video Output	H.264	Allows users to manually set the video compression.
	Audio Output	MPEG-2	Allows users to manually set the audio compression.
	Video Bitrate	12Mbit	Higher bitrates produce better quality images but they can't be transmitted as far.
	Audio Bitrate	192Kbit	Higher bitrates produce better quality audio but it can't be transmitted as far.
RF Setting	Frequency	CH60 786.00 MHz	Allows users to manually set the channel band/frequency.
	Constellation	64QAM	Set the modulation scheme used. Must be set to 64 QAM for use with DVB tuners.
	Guard Interval	1/32	The Guard Interval is the amount of time between distinct transmissions so they do not interfere with each other through echoes, reflections etc. 1/32 offers the lowest protection but the highest data rate. 1/4 offers the highest protection but the lowest data rate.
	Code Rate	7/8	Set the code rate for useful information vs total information sent. The higher the code rate the stronger the signal.
	FFT Carrier	8K	Must be set to 8K for use with DVB tuners.
	Bandwidth	8 MHz	Set the bandwidth of the modulated signal. Must be set to 8M for use with DVB tuners.
	RF Level Adj	-30dB	Control the gain to counter the effects of transmission distance and other equipment.
Information			Shows the firmware version of the MOD200 unit.
Load Default			Allows the user to restore default settings.
Change Password			Allows the user to change to password used when accessing the menu system.

Menu System

The MOD200 should be ready to use straight out of the box. You should only need to amend the below settings when cascading multiple MOD200s, when channel band 60 clashes with channels used in the local area or if you wish to change the channel name.

Service Name

Default - AlienDVR. This is the channel name as it will appear in the program guide on the TV. If the MOD200 isn't being used to connect an AlienDVR but some other equipment such as Sky box you can change the service name to suit.

Provider Name

Default - AlienDVR. This is the name of the channel provider e.g. BBC, BSkyB. This could be changed to the company installing or supplying the equipment or even a contact telephone number for the installer.

LCN (Logical Channel Number)

Default - 800. This will be the channel number on the TV. If you are using more than one MOD200 as shown on page 6 then each additional unit will need a different LCN e.g. 801, 802 etc.

Frequency

Default - CH60 786.00 MHz. This may clash with TV channels in the local area. If you are using more than one MOD200 as shown on page 6 then each additional unit will need a different channel e.g. CH61, CH62 etc. (depending on channel used in the local area)

RF Level Adj.

Default - -30Db. This normally works okay when you are inputting a strong HDMI signal. However if longer runs are involved you may need to reduce this setting.

Password

Default - 0000. When accessing the menu system you will be asked to input your password. 0000 is displayed by default so if you haven't changed the default password you can simply press the '**OK**' button. If you have previously set a password simply use the arrow buttons to select and change digits then press the '**OK**' button.

Trouble Shooting

The table below describes common problems you may encounter when using the MOD200 along with the most common solutions for rectifying the problem.

Problem	Possible Cause	Solution
Modulator not appearing as a digital TV channel	Channel Number	The MOD200 should automatically appear as channel 800.
	Signal Loss	The gain is too low due to transmission distance or interference from equipment. Increase the RF Level in the Modulator menu under 'RF Setting'.
	MPEG Code rate too low	The code rate is defined by a combination of the Bandwidth, Constellation, FEC and Guard Interval. When using DVB equipment the code rate must be at least 22MHz. Check the Code Rate table on page 12 to see if the current combination produces a signal of at least 22MHz.
	MPEG Compatibility	The MOD200 outputs video as MPEG-4. Ensure your TV supports MPEG-4 as some TVs only support MPEG-2.
	Incorrect ONID	In the UK the ONID must be set to 9018 (09018). This can be set in the 'Network Setting' menu under 'Original Net'.
Modulator appearing as a digital TV channel but no image displayed	Resolution from input device not supported by TV	The MOD200 outputs the same resolution as it receives. For example, if the resolution from the original input device is 1080p the MOD200 will output a 1080p signal. If the TV only supports a maximum of 720p the new channel will still be discovered but no image will be displayed. In this case you will need to change the resolution of the input device to one which the TV supports.
No or poor signal when using a masthead amplifier	RF Level too high	If the RF Level is too high when it is amplified the TV is swamped and can not produce an image. Reduce the RF Level in the Modulator menu under Advanced Config. This is a trial and error process so you may have to try various RF levels checking the result each time.
	Amplifier installed before modulator	The MOD200 does not support AC/DC pass through so the voltage is blocked out. When using a masthead amplifier it must be installed after the MOD200 as shown on page 7.
'Keyboard Locked No Signal In' displayed on LCD screen	Loose connections	Check the connections to both the MOD200 and signal source are correct and secure.
	Faulty cable	Try a different cable or test the cable used with other equipment to make sure it isn't damaged or faulty.
	Resolution not supported	The resolution of the signal from the input device may not be supported by the MOD200. Supported resolutions are listed in the specifications on the rear cover.

Trouble Shooting

MPEG Code Rates

The table below shows the code rates produced by different combinations of the constellation, FEC, Bandwidth and Guard Interval. DVB equipment requires a code rate of at least 22MHz so for the MOD200 to be discovered on a TV it must be outputting a codes rate of at least 22MHz:

Modulation Constellation	Code Rate (FEC)	6MHz Bandwidth				7MHz Bandwidth				8MHz Bandwidth			
		Guard Interval				Guard Interval				Guard Interval			
		1/4	1/8	1/16	1/32	1/4	1/8	1/16	1/32	1/4	1/8	1/16	1/32
QPSK	1/2	-	-	-	-	-	-	-	-	-	-	-	6.03
	2/3	-	-	-	6.03	5.80	6.45	6.83	7.03	6.64	7.37	7.81	8.04
	3/4	-	6.22	6.58	6.78	6.53	7.25	7.68	7.91	7.46	8.29	8.78	9.05
	5/6	6.22	6.91	7.31	7.54	7.25	8.06	8.53	8.79	8.29	9.22	9.76	10.05
	7/8	6.53	7.25	7.68	7.91	7.62	8.46	8.96	9.23	8.71	9.68	10.25	10.56
16 QAM	1/2	7.46	8.29	8.78	9.04	8.70	9.67	10.24	10.55	9.95	11.06	11.71	12.06
	2/3	9.95	11.05	11.70	12.06	11.61	12.90	13.66	14.07	13.27	14.75	15.61	16.09
	3/4	11.19	12.44	13.17	13.57	13.06	14.51	15.36	15.83	14.93	16.59	17.56	18.10
	5/6	12.44	13.82	14.63	15.08	14.51	16.12	17.07	17.59	16.59	18.43	19.52	20.11
	7/8	13.06	14.51	15.36	15.83	15.24	16.93	17.93	18.47	17.42	19.35	20.49	21.11
64 QAM	1/2	11.19	12.44	13.17	13.57	13.06	14.51	15.36	15.83	14.93	16.59	17.56	18.10
	2/3	14.92	16.58	17.56	18.09	17.41	19.35	20.49	21.11	19.91	22.12	23.42	24.13
	3/4	16.79	18.66	19.76	20.35	19.59	21.77	23.05	23.75	22.39	24.88	26.35	27.14
	5/6	18.66	20.73	21.95	22.62	21.77	24.19	25.61	26.39	24.88	27.65	29.27	30.16
	7/8	19.59	21.77	23.05	23.75	22.86	25.40	26.89	27.71	26.13	29.03	30.74	31.67

Other Products To Consider

Automatically play messages or sounds to welcome, warn or inform people

ATTENTION! "You are being Recorded On CCTV Please leave the area"

VoiceOFF.com®

It's easy to trigger VoiceOff to deliver its pre-recorded messages. You can use PIRs, break beams, door contacts or anything that has a switched output.

For more integrated solutions, it can be interfaced with other equipment via its RS232 and RS485 inputs to select and play one of 9000 pre-recorded messages!

- □ **Trigger Up To 9999 Sounds**
- □ **10 Alarm Inputs Trigger 10 Recordable Warnings**
- □ **Removable SD Card**
- □ **Talkback Function**
- □ **RS485 & RS232 Connection**
- □ **Weatherproof**
- □ **Activate Remotely Over The Internet**
- □ **Built-in Relay**
- □ **Additional Sound Files Can Be Downloaded at ww.voiceoff.com**

The VoiceOff is an alarm activated voice or sound warning unit that has 10 separate alarm inputs, to trigger up to 10 different recorded sound files. RS485 and RS232 inputs trigger up to 9999 sounds! Over 1000 pre-recorded sounds and messages are available for use at **voiceoff.com**.

Warning messages can be downloaded or recorded in MP3 format and stored on the removable SD card. These sounds can be used to welcome visitors, deter intruders, warn or inform people as they enter certain areas.

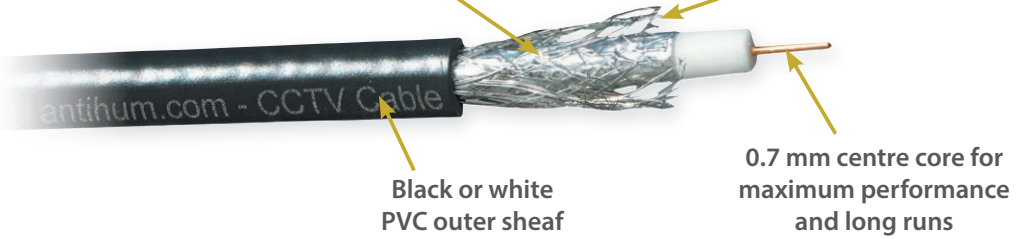**Order Code:**
VoiceOff Voice Annunciator: VOX300

Other Products To Consider

RG59 Co-ax Cable

Glued foil sheath provides maximum protection against interference and prevents "loose" foil shorting to the centre pin

0.12 x 48 aluminium wire shield

0.7 mm centre core for maximum performance and long runs

Black or white PVC outer sheaf

Order Codes:

100m Black: **CAB500**
100m White: **CAB090**
250m Black: **CAB520**
250m White: **CAB095**

High quality AntiHum branded RG59 co-ax cable can be used for both CCTV and TV systems. Available in black and white to suit any installation in lengths of either 100 or 250m.

HD Micro IR Eyeball Camera

mini R⬢K HD

53.5mm

60mm

Such a tiny camera for outdoor use is handy! The white especially suits light office walls or tiled shop ceilings or on the fascia of a porch outside a front door whilst the black version blends effortlessly against darker brick, wood or cladding for a more discrete look.

Black Micro Eyeball: SEE110B
White Micro Eyeball: SEE110W

F-Type Connectors & Leads
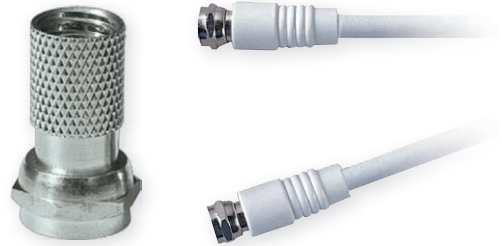
F Plugs are essential for connecting to and from the MOD200. The ready made leads are ideal for when connecting multiple units together.

Order Codes:

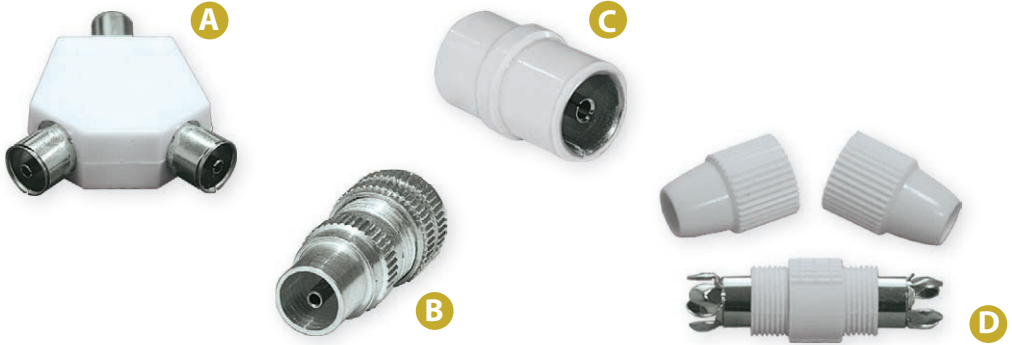**Connectors (Pack Of 10): AER207**
Connectors (Pack Of 100): AER206
1m F Plug - F Plug Lead: VID112
5m F Plug - F Plug Lead: VID115

# Other Products To Consider

Aerial Connectors

When adding to or installing a new TV system the right aerial connectors are a must have. Connectors for terminating cables, joining cables and splitting signals will all come in handy.

Order Codes:

A. Co-ax Y Splitter: **AER200**
B. Co-ax Plug (Pack Of 10): **AER202**
C. Co-ax Coupler (Pack Of 10): **AER209**
D. Co-ax Joiner (Pack Of 10): **AER204**

HDMI Adapters

180° 180° 180° 180°
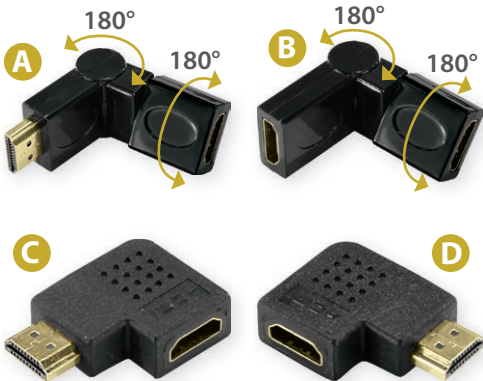
Order Codes:

A. Plug - Socket Adapter: **VID500**
B. Plug - Socket Adapter: **VID511**
C. Plug - Socket Adapter (Left): **VID512**
D. Plug - Socket Adapter (Right): **VID513**

HDMI Leads

A must have when installing modern video equipment. It's can also be a good idea to carry a few spares just in case.

Order Codes:

1m HDMI - HDMI Lead: **VID501**
2m HDMI - HDMI Lead: **VID502**
3m HDMI - HDMI Lead: **VID503**
5m HDMI - HDMI Lead: **VID505**
10m HDMI - HDMI Lead: **VID510**

Specification

Feature	Function	Specification
Video	Input	1x HDMI
	Loopthrough	1x HDMI
	Encoding	H.264 Baseline Profile Level 4.0
	Resolution	480i / 480p / 576i / 576p / 720i / 720p / 1080i / 1080p (30fps)
	Aspect Ratio	16:9 / 4:3
	Max Bit Rate	12Mbps
Audio	Input	HDMI (Stereo)
	Loopthrough	HDMI
	Encoding	MPEG Layer 2 / AAC
	Bit Rate	192kbps
Modulation	RF Input	1x F-type (75ohms)
	RF Output	1x F-type (75ohms)
	Standard	DVB-T (ETSI EN 300 744)
	Bandwidth	6MHz / 7MHz / 8MHz
	Scheme	QPSK / 16QAM / 64QAM
	Code Rate	1/2 / 2/3 / 3/4 / 5/6 / 7/8
	Guard Interval	1/4 / 1/8 / 1/16 / 1/32
	FFT Carrier Mode	2K / 8K
	MER	30dB
	RF Frequency	177 ~ 858 MHz
	RF Level	0 ~ -30dB
General	Insertion Loss	-3dB
	Configuration	Backlit LCD Display / Push Button Controls
	Language	English
	Firmware	Upgradable Via USB
	Power Supply	12V DC 1A Plug-in (Supplied)
	Operating Temperature	5°C ~ 40°C
	Operating Humidity	80% At 30°C
	Dimensions	(H)33mm x (W)172mm x (D)115mm