Stellar Labs®

HDMI to Digital ATSC RF Modulator
MODEL 33-11980

Overview:
This product accepts a high definition HDMI AV signal, and places that signal on a standard UHF television channel, to be transmitted over standard 75 ohm cable including RG59/U and RG6/U, at distances up to several hundred feet. HDMI material from a computer, DVD or Blu-Ray player, video came, HD video camera or similar source may be placed on any TV channel from CH14 through CH69.

That signal may be combined with existing RF signals from outdoor television antennas or other ATSC modulators, set to different channels. Connections include HDMI input plus feedthrough output, and modulated RF output (female F) and loop through input. USB input is also provided allowing the playing of media files from thumb drives and similar storage devices, over the modulated output.

Specifications:

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Video Input	Single HDMI with loop output
Input Resolution	Auto detect up to 1080p / 60hz
USB Input	Plays AVI and MOV from flash memory
Encoding Mode	MPEG2
Audio Format	MPEG-I Layer 2
HDMI Input	
HDMI Version	V1.3 HDCP 1.2
Transmission Speed	10.2Gbps (max)
TDMS	0.5 ~ 1.5V p-p
DDC	5V p-p (TTL)
HDMI Cable Limit	Input <5m (assumes 26AWG Ver1.3)
RF Output	
Output Format	ATSC Standard
Output Signal Strength	+25dBmV
Output Frequency	Selectable 473 ~ 803MHz / 6MHz steps
Output Channel	Selectable UHF CH14 ~ CH69
Transmission Mode	8VSB
Insertion Loss	<2dBm (from feedthrough antenna input)
Latency	70ms typical
Loop Input / Output	75ohm female F type connectors
Dimensions	1-3/8" (H) x 9-1/2" (W) x 4-3/4" (D)
Power Requirements	5VDC, 2A - AC adapter included

Modulator Front Panel

ATSC
CH14:   473 MHz

HDMI to ATSC Modulator
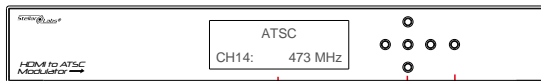
(1) LCD function display
(2) Menu control keys / center key is ENTER
(3) MENU key

Modulator Rear Panel
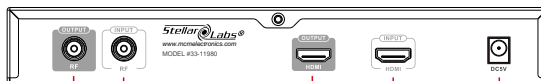
(4) External RF input
(5) Combined RF signal output
(6) HDMI loop output
(7) HDMI signal input
(8) 5VDC Power input

Controls and Connections

(1) Alphanumeric display shows output channel and frequency, and allows flash memory file navigation.
(2) Menu control keys allow navigation of menus and selection of desired media file on flash drive. Keys for UP/DOWN/LEFT/RIGHT plus center key for ENTER.
(3) MENU key puts unit in menu-select mode.
(4) RF Input allows connection from existing RF source, typically an external televsion antenna.
(5) RF output provides signal generated by the RF Modulator. Signal strength at output is typically 25dBmV. If a signal is provided at the input, it will be mixed with the modulated signal at this outpt.
(6) HDMI loop ouput provides exact signal to that sent to the HDMI input. This is provided as a convenience to drive a local monitor if desired.
(7) HDMI input accepts signal from source, compatible up to 1080p.
(8) 5VDC input for connection from included AC adapter.

IInstallation and Use

Installation of this product is fairly straight forward. Simply connect your HDMI source to the Signal Input (7) on the rear panel, and connect standard coaxial cable from the RF output (5) to your digital television receiver. This device converts the HD signal from the HDMI input to any UHF channel from 14 through 69, to be received on any standard digital television set. In this configuration, cable lengths of up to 600' can easily be used.

The output from this modulator can be split using standard CATV or antenna signal splitters to drive multiple sets. It may also be amplified as needed to drive very long cable runs or very high numbers of televisions.

Combining with Existing Signal

In many cases it may be desirable to insert the signal generated from this modulator into an existing cable coming from a CATV service provider or external antenna. The external RF Input (4) makes this very easy. Simply connect the external antenna to the (4) input. The channel from this RF modulator will be added to the existing channels, making your HDMI source simply appear as a new channel available on the television. Note that in this case, it will be necessary to rescan the channels on each television connected.

Note that in these cases it is very important that the channel selected by the RF modulator be at least 3~4 channels away from any existing channels to prevent interference between the modulator and the channel.

Very Important

Note that the channel designated number may not be the actual channel frequency a station is transmitting on. Since televisions digital changeover, many VHF stations were required to move to a UHF channel. However for branding and marketing reasons, they wanted to retain their original channel designation. For this, when the ATSC standard was established, separate "virtual" and "actual" channels were created. For example, existing channel 7 may actually be transmitting on a new UHF channel 41, even though it is still called Channel 7. To check the locations of available channels, and determine actual and virtual channel designations, MCM Electronics recommends you visit the following website: https://www.fcc.gov/media/engineering/dtvmaps.

Combining Multiple Units

One key benefit of sending high definition AV material in this manner is that it is easy to send multiple sources a great distance over a single cable. Several RF Modulators may be connected together, set to different channels, and then distributed to one or many television sets. Selecting different sources is as easy as changing the channel on the set. Keep in mind, just as mentioned above, if multiple channels are used, they should be at least four channels apart, and four channels away from existing channels inserted on the same cable.

If combining two or three RF modulators, it is likely fine that you simply daisy chain the units together, using the RF input and output. Since each unit creates 2dB of insertion loss, it is not recommended you do this with more than three modulators. In those cases, commonly available splitter/combiners should be used.

See the configurations shown on the next page.

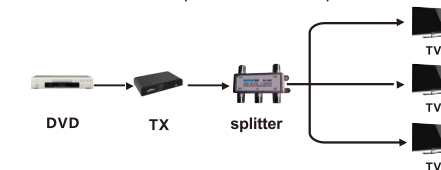**MCM Item #33-2196**
1x4 Combiner/Splitter

MCM Item #33-2187
1x2 Combiner/Splitter

Splitters/Combiners		
# of Outputs	Amount of Loss	MCM Part #
2-Way	3.5 dB	33-2187
4-Way	7 dB	33-2196

1. One transmitter to one receiver

DVD   TX   TV

2. One transmitter with a splitter in line to multiple receivers

DVD   TX   splitter   TV / TV / TV

3. Connect multiple transmitters to a combiner, you then connect the combiner to a splitter which is then connected to multiple receivers. Each receiver may independently select from any source.

DVD TX
DVD TX   splitter1   splitter2   TV / TV / TV
DVD TX
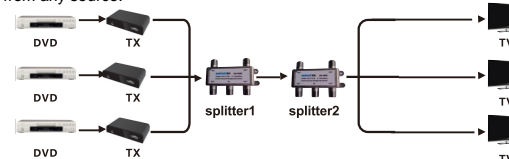
Attenuation Per 100'		
Frequency	**RG-6/U**	**RG-59/U**
200MHz	2.8dB	3.5dB
300MHz	3.7dB	4.6dB
400MHz	4.0dB	4.8dB
500MHz	4.5dB	5.5dB
600MHz	5.0dB	6.1dB
750MHz	5.6dB	6.7dB
780MHz	6.0dB	7.5dB
950MHz	6.3dB	7.9dB

Setting Modulated Output Channel

This device may be set to transmit on any standard UHF television channel from 14 through 69. See earlier information regarding considerations that should be made with regards to setting channels.

To set channel, first make sure all connections are made and power is supplied to the modulator. There is no power switch, once connected to the power source, the unit will be on. When power is applied, the display backlight will light, and after about ten seconds will read, "STELLAR LABS". After a few moments it will read, "BOOTING……..". Once it finishes the boot cycle, it will display, "ATSC", plus a channel number and frequency (in MHz).

At this point, you can press the MENU (3) button to toggle between setting the channel and viewing video files from flash memory. Selecting from multiple video files, or multiple files within folders, is done using the UP/DOWN/LEFT/RIGHT arrow keys (2).

To set the output channel:
Press the MENU button once or twice until "ATSC" and a channel number/frequency appear on the display.
Press the OK button (middle of the arrow keys). The display will read, "Main Menu >Modulator".
Press the OK button, the display will read, "Modulator >ATSC".
Press the OK button, the display will again read, "Frequency *CHxx   xxxMHZ". The xxx shown will be the actual default channel from the factory.
Press the OK button, the bottom line will change from ">" to "#" and the frequency number will begin to blink.
Press the up and down arrows, the display will scroll through the available channels from 14 through 69. The channel and frequency will change simultaneously. Note that the bandwidth of ATSC television channels is 6MHz, as you increment up and down one channel number, the frequency will increment by 6MHz.

Once a desired channel is displayed, press the OK button. This display will stop blinking and the "#" will change to "*"
Press the LEFT arrow. The display will ask, "Save Changes?" Using the LEFT and RIGHT arrows, you can select "YES" or "NO". Assuming you want to select "YES", make sure the "<" is next to the YES designation and press OK.
The display will show "Waiting………." for several seconds, then revert to showing the selected channel and frequency.

At this point, you should rescan channels on your television to ensure that this channel is visible.

UHF TELEVISION FREQUENCIES		
Channel #	Frequency (MHz)	Bandwidth (MHz)
14	473	470 ~ 476
15	479	476 ~ 482
16	485	482 ~ 488
17	491	488 ~ 494
18	497	494 ~ 500
19	503	500 ~ 506
20	509	506 ~ 512
21	515	512 ~ 518
22	521	518 ~ 524
23	527	524 ~ 530
24	533	530 ~ 536
25	539	536 ~ 542
26	545	542 ~ 548
27	551	548 ~ 554
28	557	554 ~ 560
29	563	560 ~ 566
30	569	566 ~ 572
31	575	572 ~ 578
32	581	578 ~ 584
33	587	584 ~ 590
34	593	590 ~ 596
35	599	596 ~ 602
36	605	602 ~ 608
37	611	608 ~ 614
38	617	614 ~ 620
39	623	620 ~ 626
40	629	626 ~ 632
41	635	632 ~ 638
42	641	638 ~ 644
43	647	644 ~ 650
44	653	650 ~ 656
45	659	656 ~ 662
46	665	662 ~ 668
47	671	668 ~ 674
48	677	674 ~ 680
49	683	680 ~ 686
50	689	686 ~ 692
51	695	692 ~ 698
52	701	698 ~ 704
53	707	704 ~ 710
54	713	710 ~ 716
55	719	716 ~ 722

UHF TELEVISION FREQUENCIES *(cont.)*		
Channel #	Frequency (MHz)	Bandwidth (MHz)
56	725	722 ~ 728
57	731	728 ~ 734
58	737	734 ~ 740
59	743	740 ~ 746
60	749	746 ~ 752
61	755	752 ~ 758
62	761	758 ~ 764
63	767	764 ~ 770
64	773	770 ~ 776
65	779	776 ~ 782
66	785	782 ~ 788
67	791	788 ~ 794
68	797	794 ~ 800
69	803	800 ~ 806

Warranty:

This device is warranted against manufactures defects for a period of one year from the date of purchase from the dealer. This warranty extends solely to the repair or replacement of this product and does not cover additional costs, including but not limited to installation or removal of the product or any incidental or consequential damages.

Nor does it cover damage due to improper use, storage or application of this device. Should a service issue arise within the one year period, please contact the dealer in which this device was purchased. It will be the sole decision of Stellar Labs to repair or replace any device found to be defective during this period.