MFJ-8708

High performance Mini 70cm, frequency agile Video-Audio ATV Transmitter

70cmn Mini Video/Audio Transmitter

I Only to be used by a licensed radio amateur I

Overview: The MFJ-8708 is a high quality 4 channel PLL synthesized mini (3.5 oz.) ATV transmitter. The MFJ-8708 is capable of transmitting on 4 different 70 cm ATV frequencies. Three of the frequencies coincide with the cable TV channels 58, 59 and 60. An audio sub-carrier generator is built in. All that is required is an audio source to transmit sound. No external tuning is required since the MFJ-8708 uses a PLL synthesizer. Up to 16 custom frequencies within the allocated 70 cm ATV band can be provided.

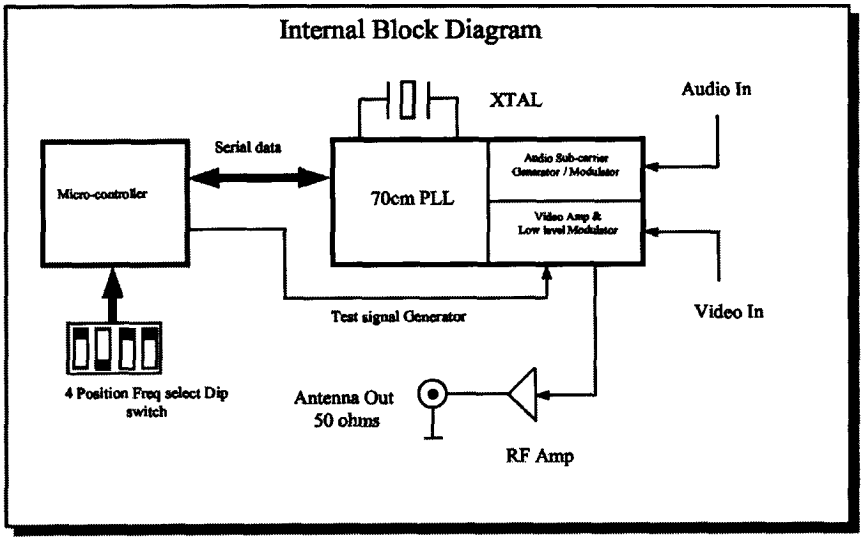
Applications:

- R/C Video-links
- Airborne video
- Balloons/ Blimps
- Point to point video
- Robots
- Hat-cams
- Public service events etc

A internal video test signal and an audio 1 kHz tone is built in for quick alignment of a receiver.

Notice:

The MFJ-8708 is an Amateur Radio ATV transmitter. The transmitter can ONLY be operated by a Technician class or higher licensed Radio Amateur in the USA and for legal purposes per 47 CFR part 97 of the FCC Rules. 97.113 of the FCC Rules prohibits Amateur Radio frequencies to be used to further any business purpose whether profit or non-profit. With few exceptions per 97.111 all transmissions must be directed to at least one other licensed Radio Amateur. Amateur Radio is intended for personal or hobby non-commercial communications between licensed Radio Amateurs. With the exception of running less than I Watt for radio control purposes, Amateurs must identify with their call letters plainly seen in the video every 10 minutes for extended transmissions and at the end of every transmission per 97.119.



MFJ-8708 User Interface

Frequency Select Dip switches

There are 4 dip switches located on the MFJ-8708 that provide frequency selection.

Dip Switch	*1*	*2*	*3*	*4*	
	0	**0**	0	**1**	**426.25MHz** *Normal Operation*
	0	0	1	0	**427.25MHz** *Normal Operation* **(Cable CH58)**
	0	1	0	0	**434.00MHz** *Normal Operation* **(Cable CH59)**
	1	**0**	**0**	0	**439.25MHz** *Normal Operation* **(Cable CH60)**
	1	1	1	0	*Test signal on* **426.25MHz**
	1	*1*	*0*	*1*	*Test signal on* **427.25MHz (Cable CH58)**
	1	*0*	*1*	*1*	*Test signal on* **433.25MHz (Cable CH59)**
	0	*1*	*1*	*1*	*Test signal on* **439.25MHz (Cable CH60)**

All other combinations of dip switch settings will turn off the RF carrier! While the MFJ-8708 is capable of operating on a total of 16 different pre programmable frequencies, stock models only provide the 4 standard USA AM ATV frequencies. If you are a foreign licensed ham and or have different band plans, MFJ Enterprises will be glad to provide you with a custom programmed MFJ-8708. Please note that we will ONLY provide you with custom frequencies that are within allocated ATV ham bands.

Antenna out

A BNC female connector provides RF output at 50 ohms exact. Make sure that the antenna is properly matched to 50 Ohms. You should also use the lowest loss coax and shortest length to minimize *loss*. *DO NOT OPERATE WITHOUT A LOAD!*

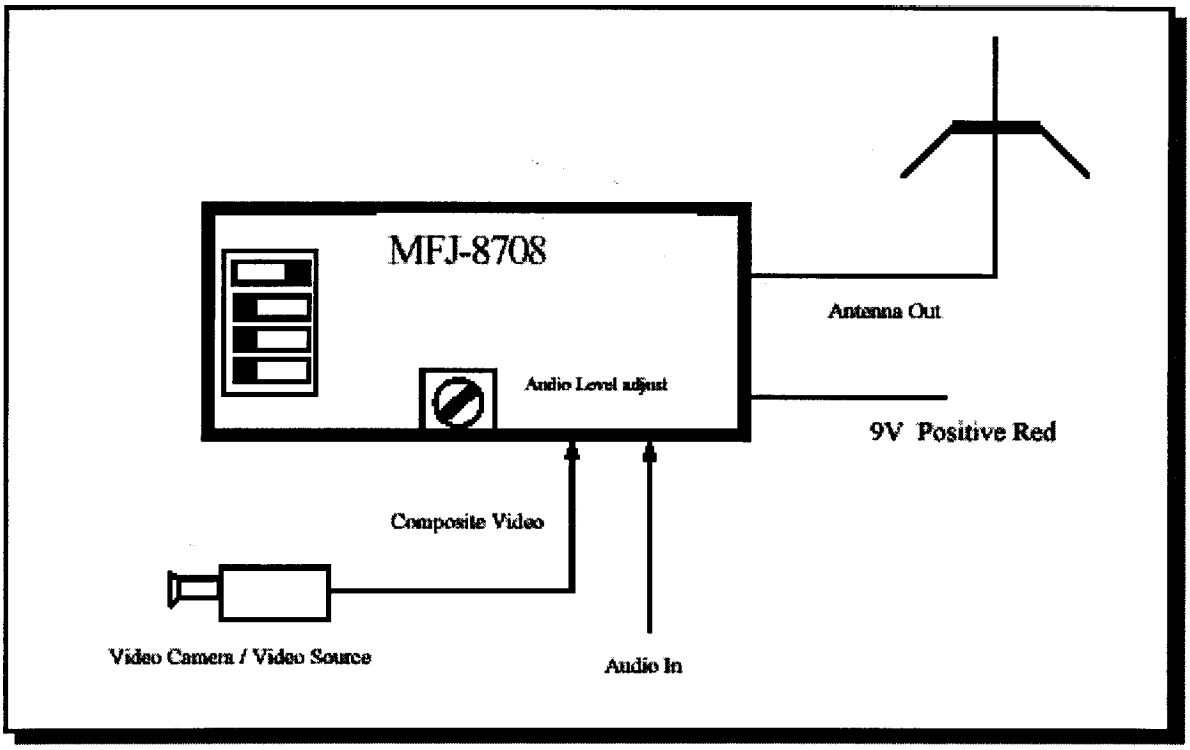
DC Power In

Supply voltage is 9V. The **Red power lead is Positive** (+) and the **Black lead is Negative (-).** The MFJ-8708 draws about 250mA of current. If you plan to use 9V batteries it is best to use two to three 9V batteries in parallel. You may certainly use a regulated external power supply with the MFJ-8708.

Audio and Video Inputs

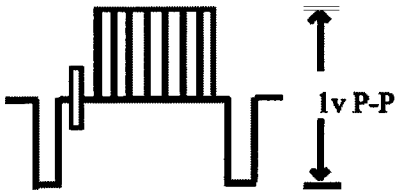
The MFJ-8708 accepts NTSC or PAL composite video at 1 V P-P. Audio is standard line level and a small potentiometer provides audio input level control.

Operation and Setup



The diagram above shows the how the MFJ-8708 needs to be connected to a video and audio source. Make sure that you have SMPTE standard video at 1 V P-P. Most consumer and commercial camera's and camcorders deliver composite video, at the **"Video Out"** connector. If you are not sure if the camera is delivering SMPTE standard video, you can confirm this by looking at the video signal on a oscilloscope.

Audio is "Line Level." Line level audio is what you would get out of a CD player or VCR audio output connector. *Note: Line level is not the same as microphone level.*



Video Signal

Power requirements

The MFJ-8708 requires 9V DC and draws about 250MA of current. There is internal diode reverse polarity protection. You may use a 0.5A fuse inline to protect the MFJ-8708. If you plan to use 9V batteries, it is recommended to use two or three batteries in parallel to extend the transmission time. Of coarse you may use a regulated power supply or 12V battery with a power regulator that reduces the voltage to 9V. DO NOT supply more than 9V to the MFJ-8708.

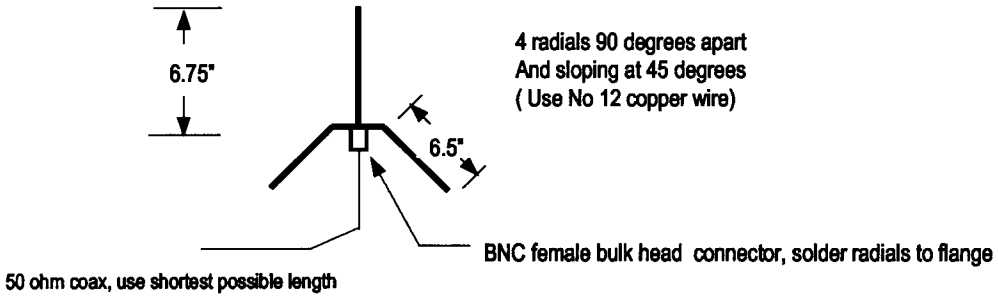
Antenna

The transmitting and receiving antenna are probably the most critical items for attaining best range. A small 1/4 wave ground plane transmitting antenna in combination with a high gain receiving antenna will do for short range video transmission. **Best results are obtained while using both high gain transmitting and receiving antennas.**

Range testing was performed using the following antennas. The transmit antenna was a 14 element yagi, the receiving antenna was an 8 element yagi . At an approximate distant of 2.5 miles excellent picture quality was received. The receiver was a consumer grade Sony TV tuned to Cable CH 59. Please remember, that while a cable ready television would suffice as a good receiver, a sensitive ATV down-converter far outperforms any cable ready television.

Using a 1 /4 wave ground plane (shown below) as a transmitting antenna and using a 14 element yagi antenna for the receiving antenna, excellent picture quality at 1 /2 mile was received.

An experimental transmit /receive antenna you could build



Some antenna performance characteristics

While some transmit-receive antennas combinations perform differently, the following chart depicts the theoretical system performance of the MFJ-8708 using various combinations of antennas and an ATV down converter

Receiver: ATV downconverter

Transmitter: MFJ-8708, with a power output of 50mW

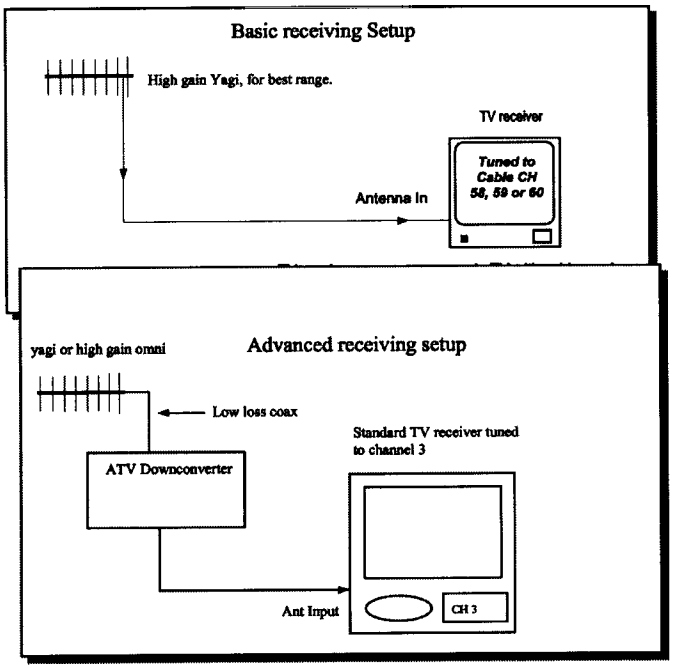
Carrier/Noise: 40 - 45 dB

Picture quality: Snow Free P5

Antenna: Ground plane, 5 element 5L-70cm beam (PC electronics), 25 element DSFO ATV-25

	Ground Plane	5L-70cm	DSFO-ATV25
Ground Plane	0.25 miles	0.6 miles	1.5 miles
5L-70cm	0.6 miles	1.3 miles	3.5 miles
DSFO-ATV25	1.5 miles	3.5 miles	8.0 miles

The two diagrams below show a basic and an advanced receiving setup. For most purposes a simple cable ready TV along with a good high gain antenna would suffice. For best DX performance, a sensitive ATV down-converter, out performs any standard TV. Remember to keep coax runs from the antenna to the receiver/down-converter as short as possible. For longer coax runs, an antenna mast mount LNA may be needed for optimum performance to compensate for coax line loss.



Technical Specification

RF System
Operational Frequency range: 425.0 to 440.0 MHz (A VSB filter in-line with the antenna is required for frequencies below 425.0 MHz with a sound sub-carrier) *(Four programmable channels provided -16 channels possible)*

Spurious emissions	: < 35dBc
Frequency Control	: PLL (Digital Phase locked loop) with XTAL reference
Transmit power to	: 50-100mW
RF output connector	: BNC female

Video

Modulation	: AM (Amplitude modulation)
Video Input	: NTSC/PAL video 1 V P-P into 75 ohms

Audio

Audio Input (Line level)	: 0.01 V to 2V p-p into 10k
Audio deviation (FM)	: 25 kHz adjustable (0.01V to 2V p-p into 10k)
Audio sub-carrier frequency	:4.5 MHz
Audio Input connector	: RCA Female

DC power

Input voltage	: 9V at 260mA

Mechanical

Size	: 1.5"W x.75"H x 3.5"L
Weight	: 3.4 oz.