

**Pacific Microwave Research, Inc.**

## **AT-100 Series**

**Microwave Video and Audio Transmitter**

# **USER'S MANUAL**



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S/N \_\_\_\_\_

## 1.1 Introduction

The AT-100 Series Microwave Video and Audio Transmitter from Pacific Microwave Research is a compact transmitter designed for short-range transmission applications under FCC Part 90 and Part 74. Common uses include law enforcement surveillance and electronic field production. The AT-100 is a compact unit designed for portable and field applications to transmit remote video to a central receive location. The AT-100 is designed to transmit one NTSC (or PAL) video signal plus two high quality video signals. The AT-100 operates from a 12 Vdc power source and is capable of up to 2 Watts of output power. The AT-100 may be equipped with up to 16 channels consistent with parameters listed on the user's FCC station license.

## 2.0 Operation

The following section describes the proper operating techniques for the AT-100 Series transmitter including power, antenna, video, and audio connections. The AT-100 generates heat during normal operation. The user should give careful consideration to mounting the transmitter in such a way as to insure heat is directed away from the housing. An external heatsink may be desirable in some operational modes.

### 2.1 Primary Connections

A number of connections must be made in order for the AT-100 to operate properly. These include dc power; transmit antenna, video input, and audio input.

#### **WARNING**

Prior to transmitting, the user should determine the proper frequency or channel of operation. Operating on the wrong frequency could cause interference to other licensed users. Part 90 users may coordinate frequencies through nationally recognized frequency coordination bodies or through local law enforcement user groups. Part 74 users should contact their local frequency coordinator or check [www.sbe.org](http://www.sbe.org) for additional information. Always verify a frequency is not in use before transmitting.

### **2.1.1 DC Power Input**

The AT-100 is designed to operate from a nominal +12 Vdc power source. Power is supplied through the front panel DB-9M connector (J3) with +12 Vdc on Pin 5 and Ground on Pin 9. This source should be fused at 2.0 A. The AT-100 will operate over a voltage range of +11 to +14.5 Vdc. Power consumption at the high power setting (2 W) is nominally 1.2 A. Power consumption at the low power setting (0.5 W) is nominally 0.7 A. The input to the AT-100 is internally protected against reverse polarity. The AT-100 transmitter is operating whenever power is applied.

### **2.1.2 Antenna**

The antenna is connected to front panel female SMA connector (J9). Any resonant antenna is suitable for connection. Antenna type and gain should be determined based upon the intended application. The AT-100 is protected against opens or shorts at the antenna terminal by an internal isolator. Only high quality coaxial cable should be used to interconnect the transmitter and antenna. All SMA connectors should be tightened with the appropriate 5/16" wrench using approximately 5 in./lbs of torque. MAXIMUM TORQUE IS 8 IN./LBS. DO NOT OVERTIGHTEN. Thumb tight connections are not suitable for reliable operation!

### **2.1.3 Video Input**

Video is input to the AT-100 through the front panel BNC connector (J10). This unbalanced input accepts a nominal 1 Vp/p video input. The transmitter may be factory configured for the NTSC or PAL standard. An NTSC transmitter must be used with an NTSC receiver. A PAL transmitter must be used with a PAL receiver. Maintenance of proper video levels is important to prevent over-modulation of the transmitter. High video levels could potentially cause interference to adjacent channel users. Low video levels will result in a lack of luminance at the receiver. Proper link performance demands attention to video levels.

### **2.1.4 Audio Input**

Audio is input to the AT-100 through the front panel DB-9M connector (J3). Typically, the AT-100 is configured for two audio subcarrier channels. Each audio subcarrier has a balanced input with a nominal impedance of 600  $\Omega$ . The AT-100 may be factory configured for line or microphone level inputs. Line level audio is typically 0 dBm and microphone level is typically -50 dBm. The input for subcarrier number one is on Pin 2 (+) and Pin 7 (-). The input for subcarrier number two is on Pin 3 (+) and Pin 8 (-). Unbalanced audio may be connected to the subcarrier inputs by connecting the high side of the audio source to the (+) terminals and leaving the (-) terminals unconnected.

### 3.0 Power Output

The AT-100 is capable of operating at two power levels to fit a variety of operational scenarios. The high power setting is defaulted with no connection to Pin 1 of J3. The nominal power output on high power is 2 W. To select low power, Pin 1 of J3 must be connected to ground. This can be accomplished by placing a jumper in the rear of the mating connector (Pin 6), by a remote switch, or by an open collector transistor junction.

### 4.0 Frequency Selection

Frequency selection of the AT-100 is accomplished by operation of a 16-position rotary switch located on the rear panel. Use a small flat blade screwdriver or “tweaker” tool to operate the switch. Frequencies are programmed into the transmitter in accordance with the users FCC license parameters. Your radio (S/N \_\_\_\_\_) is programmed as indicated in Table 1.

| CH | FREQ MHz |
|----|----------|
| 1  |          |
| 2  |          |
| 3  |          |
| 4  |          |
| 5  |          |
| 6  |          |
| 7  |          |
| 8  |          |
| 9  |          |
| 10 |          |
| 11 |          |
| 12 |          |
| 13 |          |
| 14 |          |
| 15 |          |
| 16 |          |

Table 1. AT-100 Channel Assignments

| PIN | MHz |
|-----|-----|
| 1   | 1   |
| 2   | 2   |
| 3   | 4   |
| 4   | 8   |
| 5   | 10  |
| 6   | 20  |
| 7   | 40  |
| 8   | 80  |
| 9   | 100 |
| 10  | 200 |
| 11  | 400 |
| 12  | N/C |
| 13  | N/C |
| 14  | N/C |
| 15  | N/C |

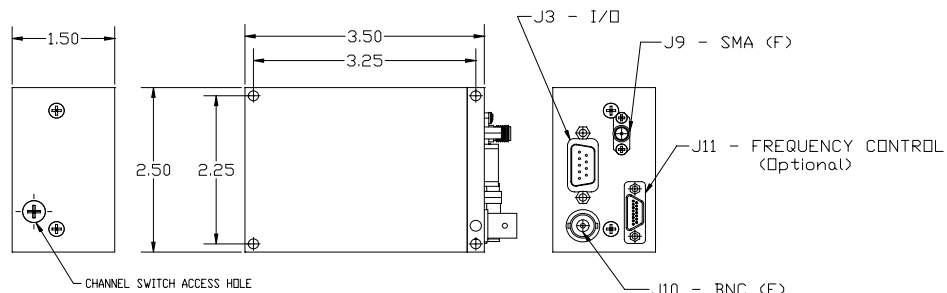
Table 2. Remote Frequency Control

As an option, users of NTIA frequencies may select the frequency of operation of the AT-100 in 1 MHz steps. This is accomplished by connecting a BCD switch to optional connector J11 in accordance with the pin-out shown in Table 2. This option is only available to government users.

## 5.0 Specifications

| ELECTRICAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | MECHANICAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li><input type="checkbox"/> Frequency Range               <ul style="list-style-type: none"> <li>o AT 100L – 1.7 to 1.9 GHz</li> <li>o AT 100S – 2.2 to 2.5 GHz</li> <li>o AT 100C1 – 3.2 to 3.5 GHz</li> <li>o AT 100C2 – 4.4 to 5.0 GHz</li> </ul> </li> <li><input type="checkbox"/> Ferrite Isolator Output Protection</li> <li><input type="checkbox"/> VSWR – Infinite (open or short)</li> <li><input type="checkbox"/> Modulation – True FM</li> <li><input type="checkbox"/> Modulation Sense – Positive</li> <li><input type="checkbox"/> Frequency Stability – +0.002%</li> <li><input type="checkbox"/> Emphasis – NTSC or PAL</li> <li><input type="checkbox"/> Spurious/Harmonic Output – &gt; -65 dBc</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Analog or Digital Input filtering options</li> <li><input type="checkbox"/> Video Input Impedance – 75 <math>\Omega</math> unbalanced</li> <li><input type="checkbox"/> Video Input Response – 10 Hz to 4.5 MHz</li> <li><input type="checkbox"/> Video Input Sensitivity – 8 MHz/Volt</li> <li><input type="checkbox"/> Audio – any two between 5.5 to 8.0 MHz               <ul style="list-style-type: none"> <li>o Phase Lock Loop</li> <li>o 20 Hz to 20 kHz +1.5 dB</li> <li>o 600 <math>\Omega</math> Balanced Input</li> <li>o Microphone or Line Level</li> </ul> </li> <li><input type="checkbox"/> Power Output               <ul style="list-style-type: none"> <li>o High Power – 2.0 W nominal</li> <li>o Low Power – 0.5 W nominal</li> </ul> </li> </ul> |
| ENVIRONMENTAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ACCESSORIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <ul style="list-style-type: none"> <li><input type="checkbox"/> Operating temperature: -10 to +65 °C</li> <li><input type="checkbox"/> Relative Humidity: 0 to 95%, non-condensing</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li><input type="checkbox"/> Antennas: A complete line of antennas for a variety of applications is available.</li> <li><input type="checkbox"/> Weather Resistant Enclosure Transmitter/Heatsink Assembly with Thumbwheel Frequency Control</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## 6.0 Mechanical



## 7.0 Connector Pin-out

Connector J3 ■ DB-9 Male ■ System I/O  
Connector Pinout Data

| Pin # | Function                                  |
|-------|-------------------------------------------|
| 1     | Lo/Hi Power – Tie to ground for low power |
| 2     | Audio 1 Input (HI)                        |
| 3     | Audio 2 Input (HI)                        |
| 4     | Aux Video Input (parallel with J10 BNC)   |
| 5     | +11 to +14.5 Vdc – Primary power input    |
| 6     | Ground                                    |
| 7     | Audio 1 Input (LO)                        |
| 8     | Audio 2 Input (LO)                        |
| 9     | Ground                                    |

## 8.0 Repair

There are no user serviceable parts inside the AT-100. Damage to the QC seals on the transmitter voids the warranty. Should your unit require service, contact Pacific Microwave Research, Inc. at 760.631.6885 or [www.pmicrowave.com](http://www.pmicrowave.com) to request an RMA number.