

AVALON RF  **Wireless Solutions**
For Audio & Video Links



TA-8 Tracking Antenna

User's Guide & Operating Manual

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<http://www.avalonrf.com/>

Avalon RF, Inc. • 344 Coogan Way • El Cajon, CA 92020
Phone: (619) 401-1969 • Fax: (619) 401-1971 • Email: sales@avalonrf.com

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1. General

The TA-8 Tracking Antenna is intended for use in military, homeland security, mobile security etc. for reception of wireless video from a moving source (e.g a UAV/ Helicopter). The unit is completely self contained and requires no setup or connections of antennas, cables etc. All necessary cables have been supplied to setup the link within a few minutes.

The TA-8 features a unique patented design that allows for excellent reception of wireless video from within any hemispherical location of the moving transmitter. The TA-8 does not have any moving parts, which facilitates its usage in harsh weather including dusty/ saline/ icy environments. The absence of moving parts allows permanent installation on roof tops/ high rise buildings and is also suitable for mobile operations. The operating distance (radius of the hemispherical pattern) depends on a variety of factors such as transmit antenna gain, transmitter power etc.

There are 3 versions of the TA-8:

- a) TA-8 (standard) : Video and Audio reception
- b) TA-8-C1 (UAV model): Video and Telemetry downlink data at 4.8Kb/s
- c) TA-8-C2 (UAV model): Video, Telemetry downlink and Control Uplink

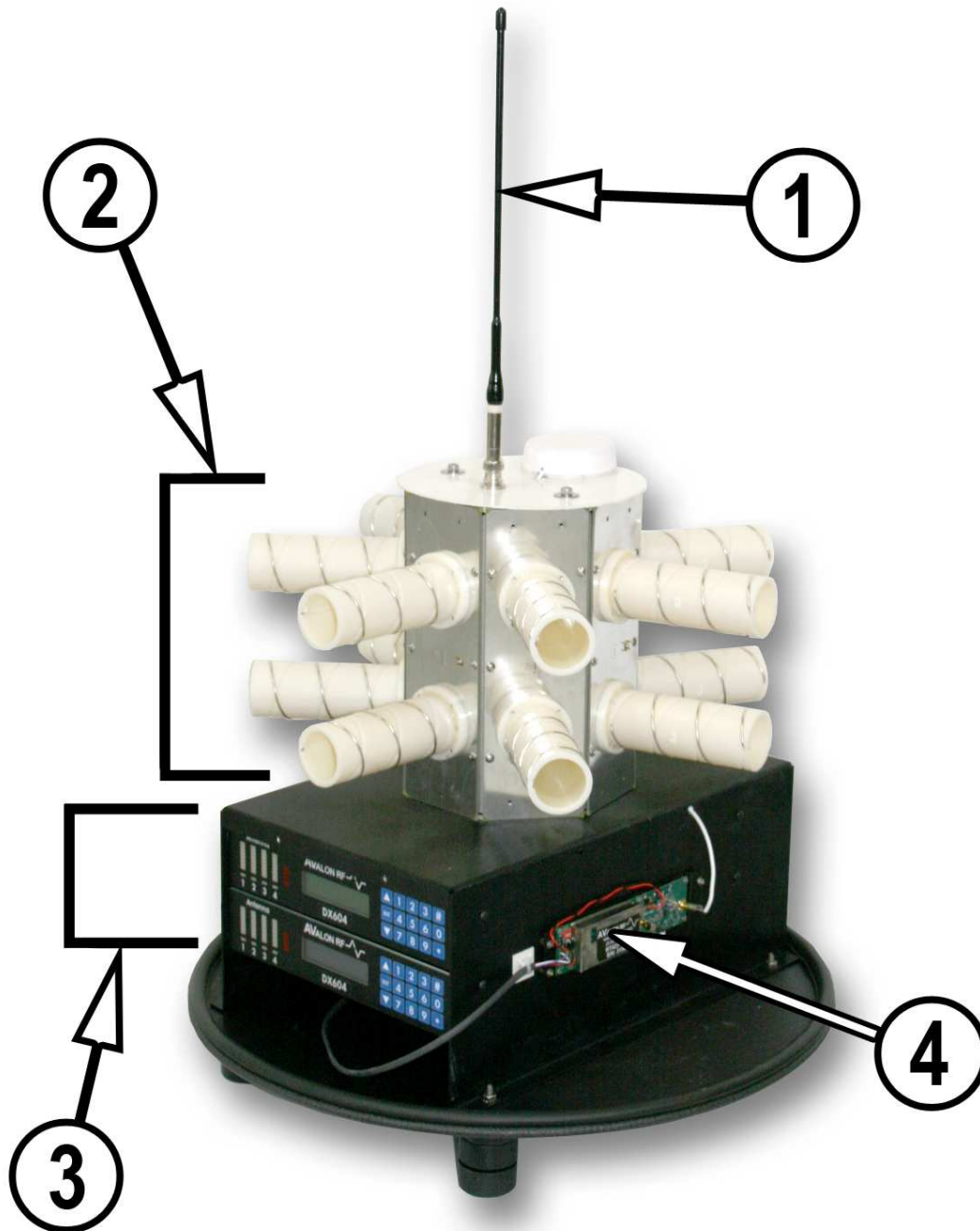
All 3 models offer the following features:

- A single high quality video channel with no delay.
- Complete operator free reception from any hemispherical direction

Optional features (each ordered individually).

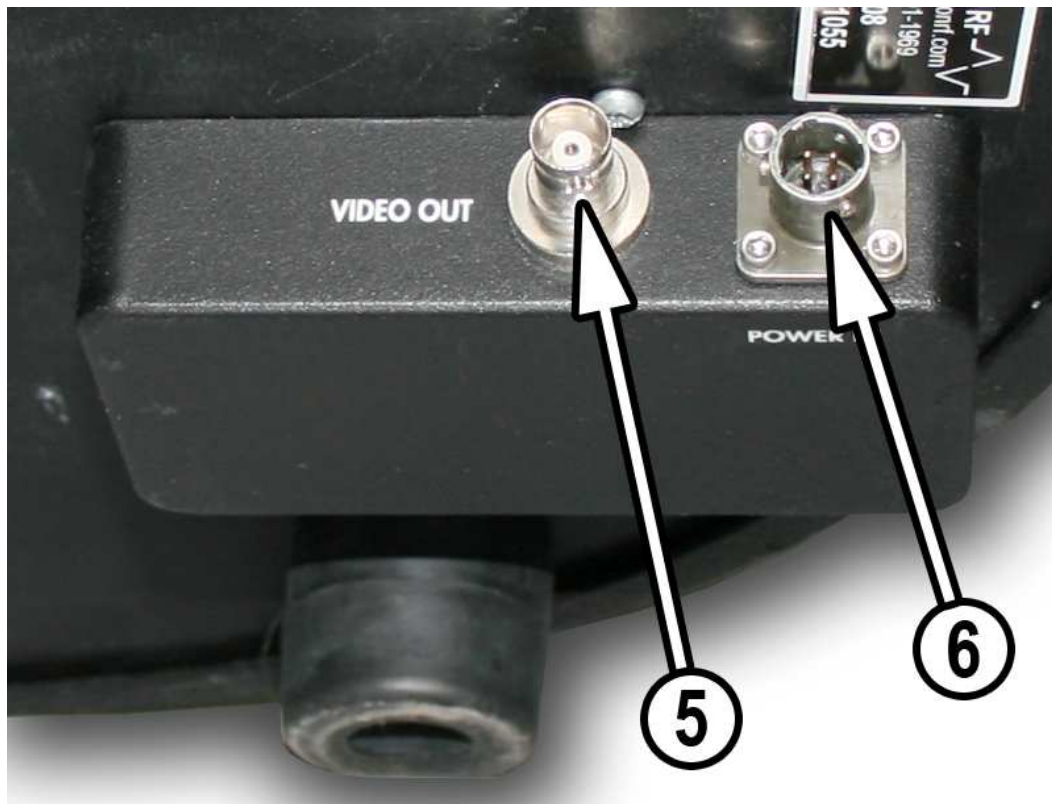
- Telemetry down Link.
- Control Uplink.

Any reference in this manual to TA-8 implies all 3 models.



Side View	
1	Control Uplink Antenna (UHF)
2	Antenna Array
3	DX604 Receivers
4	Control Uplink Module

Figure A – TA-8 Series Controls and Connectors



Bottom View	
5	Video Output
6	Power & I/O Connector

Figure B – TA-8 Series Controls and Connectors

1.1 Radio Reception.

The TA-8 has 8 antennas configured in a flower like arrangement. 7 antennas cover the 360° azimuth while an 8th antenna looks straight up. This gives complete reception within the hemisphere. The user does not have to make any antenna connections. The TA-8 is tuned to receive a rf channel by tuning the two DX604's.

1.2 Video Output.

The intelligent electronics in the TA-8, does diversity both on the rf signal and then on the video. The final output is available dc restored to ground and continuously corrected for optimum level (1V p-p).

1.3 Telemetry Downlink (optional).

With this option, the audio sub-carrier on the rf signal is configured to receive digital data at 4.8Kb/s. This received digital information is then processed for timing recovery and made available at RS232 levels for direct connection to a serial port of a pc.

1.4 Control Uplink (optional).

This option adds a uplink radio link which works on UHF frequencies. A separate omni directional antenna is installed inside the TA-8 for communication with a companion receiver on the airplane. This link accepts RS232 level input at 4.8Kb/s and transmits the data wirelessly with error correction for perfect reception.

The combination of this link and the telemetry downlink option gives a full duplex data communication with the bird (UAV/ Helicopter).

1.5 Power.

The TA-8 works off a standard 12V power source. The load is approx 3A or less. Avalon RF has supplied a universal input 100-240V, 50-60Hz power supply that is recommended to be used with this unit. If the user plans to use their own power supply (such as Vehicle operation), please ensure that the power supply is capable of at least 7-8A to allow for the turn-on current surge.

2. Specifications

2.1 Electrical Specifications.

Frequency Range:	2400 – 2483 MHz (standard) 2150 – 2500 MHz (extended – Option 4)
Tuning:	Individual tuning via front panel of 2 x DX604's;
Tuning resolution:	250 KHz
RF Sensitivity:	typ better than - 84 dBm
Bandwidth:	27 MHz
Antennas:	7 x 15 dBic RHCP helical antennas to cover 360° azimuth 1 x 6 dBic RHCP patch antenna for over head coverage
Video Output:	NTSC or PAL (depending on system ordered)
Video level:	1 Vp-p into 75 ohm, Negative Sync Tip, dc restored to ground.

Telemetry Downlink (optional)

Telemetry output:	RS232 compatible signal levels with 8 data bits, No Parity, 1 stop bit
Baud Rate:	4800 Baud

Control Uplink (optional)

Frequency Range:	392-420 MHz standard; any 40 MHz band in the frequency range 350 MHz – 800 MHz possible
No of Channels:	16 through 4 DIP switches
RF Impedance:	50 ohm
RF Output:	1W
Antenna:	Half wave Omni directional (2.2 dBi gain); mounted inside dome
Data Input:	RS232 compatible signal with 8 data bits, No Parity, 1 stop bit
Data Rate:	4800 Baud

Power: 12V unregulated DC nominal; 10.5 -17V DC input
Consumption: < 3A

2.2 Interconnecting.

All input/ output connections to the TA-8 are available through the BNC and the 8 pin connector on the IO box on the bottom of the unit.

Video output is through the BNC (f) connector labeled VIDEO.

The pin out of the 8 pin connector is as shown in figure C.

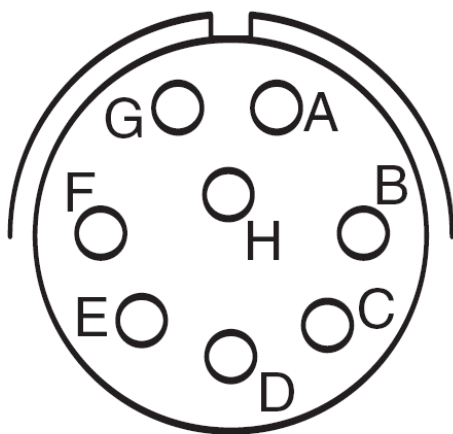


Figure C – IO Connector pinout

Pin #	Function
A	Power Input (+12Vdc Nominal)
B	Power Return (Ground)
C	Control Uplink Ground
D	Control Uplink Data (RS232)
E	Telemetry Downlink Ground
F	Telemetry Downlink Data (RS232)
G	<i>Reserved</i>
H	<i>Reserved</i>

Avalon RF has supplied a 8 pin cable that breaks out into separate connections for power, telemetry and control uplink (if ordered). The telemetry downlink and the Control uplink connectors are standard 9 pin D-type connectors that interface directly to the serial COM port of a PC.

2.5 Mechanical

2.5.1 Mounting/ Installation.

The TA-8 is shipped in a transit case and has room to accommodate all cables and power supplies. The radome of the TA-8 is designed to prevent formation of ice and is thus suitable for all climatic conditions.

For mobile applications the TA-8 should be placed as high as is practically possible to maximize the operating range/ distance. Ensure that the TA-8 is placed on a horizontal surface that does not have any transmitters in the immediate vicinity of the chosen location for the TA-8. It can be placed on the roof of a Humvee or truck although a higher location will improve operating range.

For fixed installations, a mounting plate can be used to mount the TA-8 on top of a pole or similar structure.

2.5.2 Mechanical Data.

- a) Size (see Figure G) D = approx. 19 in (48 cm)
H = approx. 27 in (69 cm) for TA-8 & TA-8-C1
H = approx. 31 in (79 cm) for TA-8-C2
- b) Weight approx. 28 lbs (12.7 Kg) for TA-8 & TA-8-C1
approx. 32 lbs (14.5 Kg) for TA-8-C2
- c) Shipping weight <
<



Figure G – TA-8 Series Mechanical Outline

2.6 Environmental Conditions.

The TA-8 Series is designed to meet the following environmental conditions:

- 2.6.1 Operating temperature -4° to 122° F
-20° to 50° C
- 2.6.2 Storage temperature -13° to 150° F
-25° to 65° C
- 2.6.3 Humidity 5 to 95%, non-condensing
- 2.6.4 Inclination Any
- 2.6.5 Altitude -1500 feet to 15,000 feet
-450 meter to 4,500 meters

3. Operating the TA-8.

All required antenna connections have been made before shipping the TA-8. Please do not disconnect any antenna at any time.

NOTE

The TA-8 requires a radio line of sight (LOS) to work correctly. It may be used in other non-LOS situations but the operating distance could be significantly reduced.

- 3.1 The only operator control is the frequency setting on each DX604.

Please DO NOT refer to the DX604 manual and attempt to configure the DX604's differently. Doing so could result in the TA-8 becoming non-functional.

The following command sets the frequency of a DX604:

<FREQ> <ENTER> tunes in to the desired frequency. The <*> key is used as a decimal point.

The DX604 tuning range is from 2400 MHz to 2483 MHz (2150 to 2500 MHz with Option 4).

E.G.:

2412<ENTER> tunes a DX604 to 2.412GHz.

The tuned-in frequency appears on the top left of the LCD.

If <FREQ> is out of the tuning range, the receiver will display "INVALID" and default to the last valid tuned-in frequency.

E.G.:

912<ENTER> is beyond the tuning range of the DX604 and will be rejected.

If the frequency is valid, it is saved even when power is turned off. If the display and the bargraph's are blinking, it is an indication that the input voltage is below 10.5V. In this case, to prevent corrupted data being stored, any new setting of the DX604 will NOT be saved. The last setting made when power was good will be retained.

To prevent unauthorized/accidental change of the receive frequency/channel, the keypad can be locked.

*077 <ENTER> locks the keypad.

*055 <ENTER> unlocks the keypad.

The LCD displays a "L" at the bottom right if the keypad is locked.

3.2 General Guidelines

While the setup of the TA-8 link is very simple, observing a few considerations will help get the optimum performance.

First, height of the equipment plays an important role in the distance over which the radio link works. The higher you place the TA-8, the longer the available link range. Please use proper judgment of safety when following this advice, especially for mobile applications.

For any rf signal, having metal objects near the receiving or transmitting antenna will severely affect the performance. With this in mind, avoid placement in any location that has large metal structures or objects that hinder a good LOS to the transmitter. The TA-8 being a microwave receiver, trees and buildings are also an obstruction to signal reception.

The radio link must be configured correctly and the equipment chosen to meet the required range/ distance. Choice of transmitter amplifier, output power, type of antenna etc. is governed by considerations such as battery power on the UAV/ airplane, antenna height allowed, cooling for transmitter etc. If you need assistance, please call Avalon RF Engineering at 619-401-1967.

4. Error Conditions

T.B.D.

5. Ordering information

5.1 Base models

TA-8	Standard TA-8
TA-8-C1	TA-8 with Telemetry downlink
TA-8-C2	TA-8 with Telemetry downlink and Control Uplink

All units come with the following standard accessories:

5.1.1 A heavy-duty carrying case

5.1.2 Universal input (100 – 240V, 50-60 Hz) AC power adaptor.

5.1.3 User guide & operating manual (this manual).

Additional accessory supplied with TA-8-C1 and TA-8-C2:

5.1.4 Interface cable for connection of data IO.

5.2 Options.

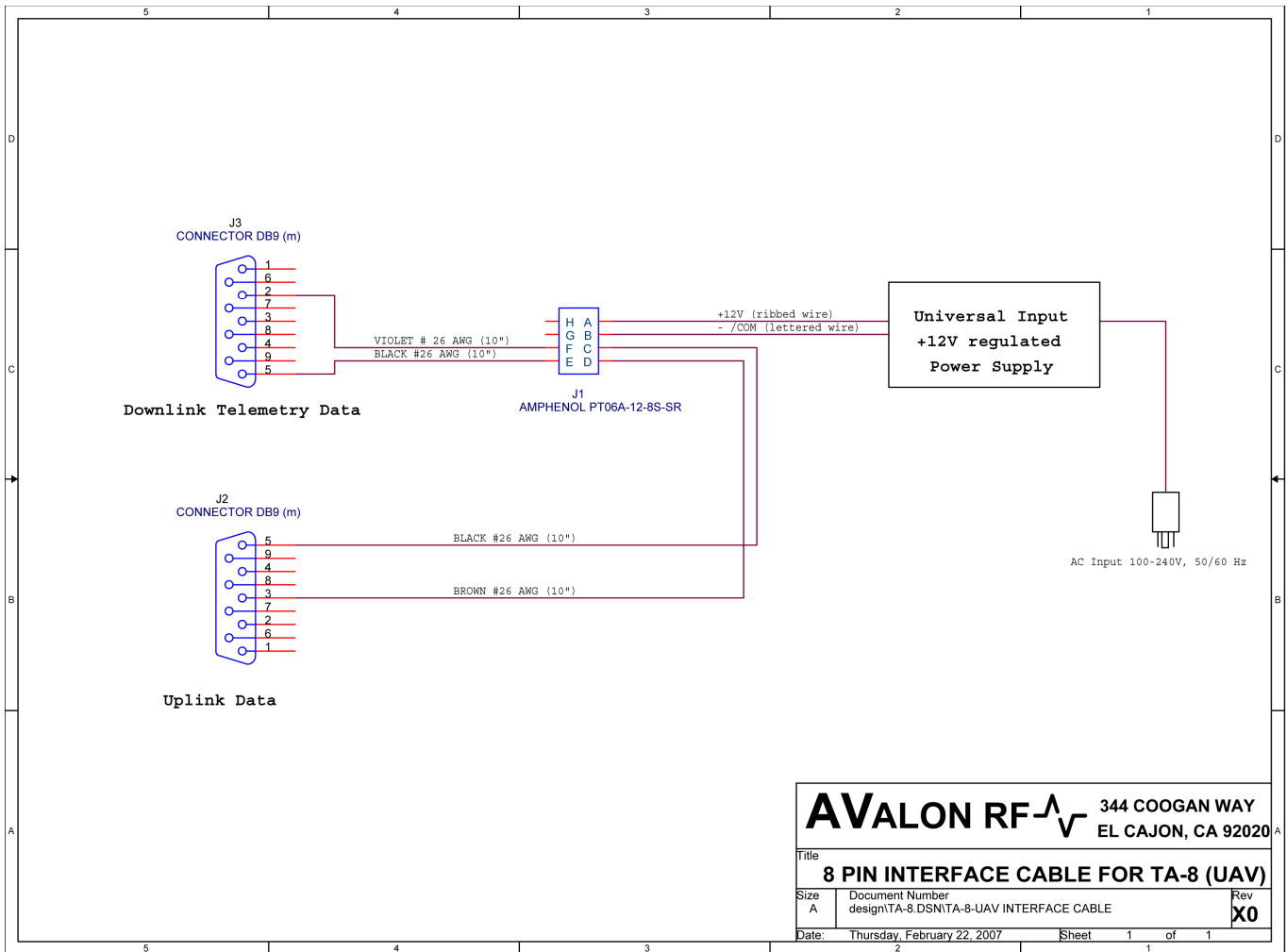
5.2.1 Option 00 – European version (PAL).

5.2.2 Option 04 – Extended tuning range
TX600 series – 2.150GHz to 2.5GHz

5.3 **Recommended accessories.**

5.3.1 Additional power (power/ data IO) cable for mobile applications

Appendix A



AVALON RF  344 COOGAN WAY
 EL CAJON, CA 92020

Title		
8 PIN INTERFACE CABLE FOR TA-8 (UAV)		
Size	Document Number	Rev
A	design\TA-8.DSN\TA-8-UAV INTERFACE CABLE	X0
Date:	Thursday, February 22, 2007	Sheet 1 of 1