

Procaster Installation Manual



Procaster AMTX200 AM Transmitter

Important!

Safety Warning

Never mount near electrical power lines!

Safety Ground Warning

For the built-in lightning protection to work properly, the Procaster must be properly grounded. Consult your local electrical safety standards.

Transmitter RF Ground

For maximum range, the Procaster grounding lug must also be connected to a good **RF (radio frequency) ground**. Electrical and RF grounds are often considered to be the same, but sometimes they are not. A good RF ground will cause maximum current to flow in the antenna resulting in greater radiation and best range.

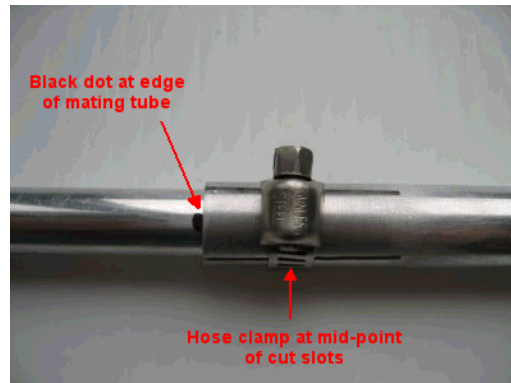
IF YOU ARE NOT GETTING SUFFICIENT RANGE, YOU MAY HAVE TO EXPERIMENT WITH DIFFERENT RF GROUNDING – SEE RF GROUNDING SECTION AT THE END OF THIS USER MANUAL!

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Installation

1. Assemble the 3 antenna sections by lining up the black dot on one section with the edge of the mating section. Secure sections with the provided hose clamps.

Warning: FCC rules (47 part 15.219) state: "the total length of the transmission line, antenna and ground lead (if used) shall not exceed 3 meters." [3 meters = 118 inches]



2. Remove the plastic shipping protective bolt tubes and discard them and attach the antenna to the side of the transmitter using the 2 nuts provided.
3. Mount the transmitter vertically in a clear area away from trees, power lines and other obstructions. If mounting to a mast (1-5/8in diameter max.), use the U-bolts provided.



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4. Connect a 14 AWG or heavier wire from the grounding lug to a suitable ground. (grounding rod in the earth, water pipe, existing electrical ground, metal roof etc. See RF grounding section at the end of this manual.



5. Connect the 4 conductor wire as follows:

Procaster end...

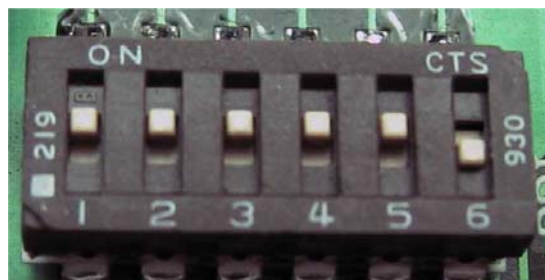
- Shield to SHLD (shield wire is the bare wire that contacts the foil)
- RED to +12V
- BLACK to 0V
- GREEN to AUD-
- WHITE to AUD+

Studio Interface end...

- RED to +12V
- BLACK to 0V
- GREEN to AUD-
- WHITE to AUD+

The shield is only connected at the Procaster end. At the Studio Interface – simply cut the shield off.

6. Choose Channel Frequency
Using the 6-position option switch located inside the Procaster transmitter, choose the highest clear frequency possible. Higher frequencies give better range.



Broadcast frequency option switch (1610kHz shown)

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Channel Settings						
Freq kHz	S1	S2	S3	S4	S5	S6
1290	ON	ON	ON	ON	ON	ON
1300	OFF	ON	ON	ON	ON	ON
1310	ON	OFF	ON	ON	ON	ON
1320	OFF	OFF	ON	ON	ON	ON
1330	ON	ON	OFF	ON	ON	ON
1340	OFF	ON	OFF	ON	ON	ON
1350	ON	OFF	OFF	ON	ON	ON
1360	OFF	OFF	OFF	ON	ON	ON
1370	ON	ON	ON	OFF	ON	ON
1380	OFF	ON	ON	OFF	ON	ON
1390	ON	OFF	ON	OFF	ON	ON
1400	OFF	OFF	ON	OFF	ON	ON
1410	ON	ON	OFF	OFF	ON	ON
1420	OFF	ON	OFF	OFF	ON	ON
1430	ON	OFF	OFF	OFF	ON	ON
1440	OFF	OFF	OFF	OFF	ON	ON
1450	ON	ON	ON	ON	OFF	ON
1460	OFF	ON	ON	ON	OFF	ON
1470	ON	OFF	ON	ON	OFF	ON
1480	OFF	OFF	ON	ON	OFF	ON
1490	ON	ON	OFF	ON	OFF	ON
1500	OFF	ON	OFF	ON	OFF	ON
1510	ON	OFF	OFF	ON	OFF	ON
1520	OFF	OFF	OFF	ON	OFF	ON
1530	ON	ON	ON	OFF	OFF	ON
1540	OFF	ON	ON	OFF	OFF	ON
1550	ON	OFF	ON	OFF	OFF	ON
1560	OFF	OFF	ON	OFF	OFF	ON
1570	ON	ON	OFF	OFF	OFF	ON
1580	OFF	ON	OFF	OFF	OFF	ON
1590	ON	OFF	OFF	OFF	OFF	ON
1600	OFF	OFF	OFF	OFF	OFF	ON
1610	ON	ON	ON	ON	ON	OFF
1620	OFF	ON	ON	ON	ON	OFF
1630	ON	OFF	ON	ON	ON	OFF
1640	OFF	OFF	ON	ON	ON	OFF
1650	ON	ON	OFF	ON	ON	OFF
1660	OFF	ON	OFF	ON	ON	OFF
1670	ON	OFF	OFF	ON	ON	OFF
1680	OFF	OFF	OFF	ON	ON	OFF

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1690	ON	ON	ON	OFF	ON	OFF
1700 *	OFF	ON	ON	OFF	ON	OFF

Note: for best range, use 1600kHz and higher

* Switch selections above 1700kHz will not allow a higher operating frequency than 1700kHz

7. Power up - plug the wall adapter into the Studio Interface (do not connect the audio yet).

8. Once the broadcast channel is set, turn the antenna tuning capacitor (this is the yellow or blue circular component labeled C18 near the yellow antenna wire) using the included tuning tool until a maximum reading is seen on the tuning meter.

Place the recessed end of the tuning tool over the brass slotted screw of the trimmer capacitor and turn in either direction until a maximum reading is seen on the tuning meter. Stand away from the antenna when tuning as your body will affect the results.

9. Close up the Procaster. Tighten the 2 cover screws evenly – don't over-tighten!

10. Connect audio.

11. It may be necessary to adjust the gain control on the Studio Interface to suit the audio source being used. Some headphone jacks on MP3 players have a low output voltage. To increase gain on the Studio Interface, adjust the gain control CW (accessed through a hole in the side of the Studio Interface) using a small screwdriver.

12. Inside the Studio Interface, adjust the desired modulation depth to suit your listening preferences.

13. Inside the Studio Interface, select the desired compression using the jumper...

- 1:1
- 2:1 (default)
- 5:1
- 10:1

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RF Grounding

The ground connection on the Procaster serves 2 purposes:

1. Safety ground for lightning protection.
2. RF (radio frequency) ground for return of ground currents from the antenna.

The base-fed vertical antenna on the Procaster is in reality only half of the antenna, the other half being a mirror image in the earth. In order to achieve the best range it is important that the ground be as conductive to RF currents as possible.

Remember, there are other contributing factors as well as the ground that can affect overall range and performance such as metal shielding, obstructions, absorbers (trees), other broadcasters nearby (maybe on other frequencies) and electrical fields from power lines. So it's important to make sure that things that you have control over are done properly.

Here are some grounding choices which will be discussed:

1. Radial ground system
2. Grounding rod(s)
3. Metal roof
4. Underground metal water pipes
5. Building electrical ground

1. The Radial Ground System

The most efficient method is to use a radial ground system directly under the Procaster installation - this will give the best range with the strongest, noise-free signal. The ground system consists of wires laying on top of or installed under the ground in a pattern similar to the spokes of a wheel. Because this is a dedicated ground, other electrical noises will not pollute your signal.

We recommend the following items from www.dxengineering.com for a professional job that will last:

DXE-RADP-1P Radial plate (with 20 sets of stainless steel hardware)



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DXE-RADW-500KBD Bulk radio wire kit (wire, lugs and biodegradable anchors)



In our example, a metal plate is placed under the mount of the Procaster which can be a wooden or metal post. Make sure you leave enough room to account for snow build up if that is a factor in your area.

Extend outward 20 radial wires 20 ft long each from the metal plate. If you do not have sufficient room, then use 40 radial wires 10 ft long each (double up 2 radials per bolt in this case). The next step is to install the disappearing ground wires without digging...

The best time to do this is early spring but it can be done other times, as well. The idea behind this is to get the grass of your lawn to grow over the radials and protect them from the mower.

First, mow the grass pretty short (about 1 in long after cutting) in the areas where you will be laying the radials down.

Next, connect the radials to the radial plate with the lugs provided.

Starting from the radial plate, pull the radial wire taught and push in a biodegradable anchor to hold the radial wire as close to the grass roots as possible. Use a hammer to drive it home. If the radial wire is sticking up any place due to uneven ground or the wire is loose just put another staple there. The idea is to get all parts of the wire down as close as possible to the ground so that the grass can grow over it.

Here is what it should look like.



Typically when you finish the last radial, your job is done. Mother Nature will do the rest. If you have done this in the early spring, the grass will grow up, surround the wire and pull it down firmly along its full length. If you do it in the fall after the grass has stopped growing, it will happen the

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next spring. This will be done so completely that in a few weeks you will have to actively look for the radials to see them.

Connect the plate to the ground lug of the Procaster with a 12 or 14 AWG copper wire.

2. Grounding Rods

If your space is limited, a grounding rod can work well. Drive in a copper-clad steel rod (available at Home Depot, Lowes and electrical distributors etc.), at least 8 ft. If the ground is hard, use several shorter rods and connect them together using a 14 AWG or heavier copper wire and the proper bronze clamps to make sure the electrical connection is good. Because this is a dedicated ground, other electrical noises will not pollute your signal. Connect the ground rod(s) to the ground lug of the Procaster with 14 AWG or heavier copper wire.

3. Metal Roof

A metal roof can provide an effective elevated ground system. If the metal panels are electrically isolated from each other, performance may not be as good. The Procaster can be mounted on a tripod which is attached to the roof with bolts or is held in position with concrete blocks. The advantage of the elevated ground system is that the transmitter is higher and more likely to have better range. Connect the ground rod(s) to the ground lug of the Procaster with 14 AWG or heavier copper wire.

4. Underground metal water pipes

Electrical panels usually ground to the copper water pipe very near to where it comes out from the ground inside the building.

It is unknown how well these pipes are connected electrically, and the electrical system may induce noise into the Procaster which will be heard on the receiving radio.

In this setup, the Procaster ground wire could be long, and this extra inductance could raise the impedance of the ground connection, making the ground as a whole, less effective. Connect the ground rod(s) to the ground lug of the Procaster with 14 AWG or heavier copper wire.

5. Building electrical ground

Building electrical grounds can work quite well, but there is the risk of electrical noise from household appliances getting picked up by the Procaster and transmitted to the receiving radio. This is something you have to try out and see - all situations are different. Connect the ground rod(s) to the ground lug of the Procaster with 14 AWG or heavier copper wire.

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Compliance Statement

FCC ID: VCJ-AMTX200

This device complies with Part 15.219 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning:

Changes or modifications not expressly approved by Chezradio could void the user's authority to operate the equipment.

FCC Class B Statement:-

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instructions may cause interference harmful to radio communications.

There is no guarantee, however, that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or TV technician for help.

Warning: FCC rules (47 part 15.219) state: "the total length of the transmission line, antenna and ground lead (if used) shall not exceed 3 meters." [3 meters = 118 inches]

The Procaster has a fixed 104 inch electrical antenna, no transmission line and a grounding lug which must be connected to a ground point for lightning protection. That implies that the "ground lead" from the grounding lug to a massive ground can be up to 14 in long to comply with the 15.219 rules.

Bear in mind that the Procaster has lightning protection built in to prevent lightning from entering into a residence and possibly injuring somebody. For safety reasons, it is essential that proper grounding is implemented and that all local electrical safety codes are observed.

IC: 7378A-AMTX200

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Cet appareil est conforme avec Industrie Canada exempts de licence standard RSS (s). Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne doit pas provoquer d'interférences et (2) cet appareil doit accepter toute interférence reçue, y compris les interférences pouvant entraîner un fonctionnement indésirable.

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Specifications

Procaster Transmitter

Electrical

- Channel Frequencies 1290 - 1700kHz
- PLL Channels 42 with 10kHz spacing
- Fine Frequency Adjust +/-10Hz
- Auto Power Setting 100mW
- Tuning Meter Built in
- Audio input 600 ohm balanced

Mechanical

- Solid machined aluminum casing and cover
- O-ring weatherproof seal
- Stainless steel hardware
- Antenna Side-mount 3-section
- Size 8.25in L x 4in W x 2.5in H
- Weight 2.5 lb
- Mounting 4 slots on 7.2in x 2in centres
- Antenna mounting 4in centres
- Finish UV-resistant outdoor polyester

Studio Interface

Electrical

- Audio level input 200mV - 3V adjustable
- Audio processor may be turned off when using external audio processor
- Compressor settings 1:1 2:1 5:1 10:1
- Audio limiter automatic
- Modulation depth adjustable
- Audio output 600 ohm balanced
- Audio drive up to 250ft
- Power input (system) 12VDC @ 100mA
- Solar panel compatible yes

Mechanical

- Black ABS plastic with aluminum cover
- Size 3.4in L x 2.4in W x 1.1in H
- Weight 5 oz
- Mounting 2 holes on flanges on 3.9in centres