Model 20981
UHF Data Radio

User's Manual

Rev. A

allweatherinc

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- **E-mail** your support request to support@allweatherinc.com

Revision History

Revision	Date	Summary of Changes
A	2020 Feb 15	Initial release.

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1. OVERVIEW

The Model 20981 UHF Data Radio is an integrated modem and radio that provides digital data transmission at data rates of 9600 bps in a 12.5 kHz channel over a frequency range of 450–470 MHz. The user data interface is a serial port through a 15-pin D connector, and is configured for RS-232 signal levels. The Data Radio comes in a small, compact package that is easy to integrate into new systems or retrofit into existing systems.

Transmit and receive LEDs provide the operational status of the Data Radio.

The antenna interface to the Data Radio is through a standard 50 Ω female BNC connector. A variety of antennas can be used.

1.1 INSTALLATION KITS

Kits have been prepared to allow the Model 20981 UHF Data Radio to be installed in an AWOS 3000 CDP, a DCP, or as a retrofit to a previous installation using other radio modems. The kits provide the UHF Data Radio(s), attenuator, other hardware, and cables needed for the installation.

Table 1. Model 20981 UHF Data Radio Installation Kits

Part Number	Description
M488306-01	AWOS 3000 CDP Installation Kit
M488678-00	Retrofit Kit to replace AWOS 3000 CDP and DCP radios
M488679-00	DCP Installation Kit

1.2 FCC REGULATIONS

1.2.1 Licensing

The FCC and regulatory authorities in other countries require that the radio owner/operator obtain a station license for the radio before using the equipment to transmit, but do not require an operating license or permit. The station licensee is responsible for proper operation and maintenance of the radio equipment, and for ensuring that transmitter power, frequency, and deviation are within the limits specified by the station license. This includes checking the transmitter frequency and deviation periodically using appropriate methods.

1.2.2 Equipment Authorization (Certification)

FCC Approval had been granted for the Model 20981 UHF Data Radio in November, 2014.

1.2.3 Radio Frequency Exposure

The FCC, with its action in General Docket 79-144, March 13, 1985, adopted a safety standard for human exposure to radio frequency electromagnetic energy emitted by regulated equipment.

The Model 20981 UHF Data Radio has been evaluated for compliance with the maximum exposure limits for RF energy at the maximum power rating of the unit. To ensure compliance with the General Population/Uncontrolled maximum exposure limits, please ensure that all persons will be at least 20.5 cm (8.1") away from the antenna.

2. I/O CONNECTOR AND LED INDICATORS

2.1 I/O CONNECTOR

Table 2. I/O Connector Pinout

Pin	Name	Description	Comments
1	—	—	Not used
2	—	—	Not used
3	—	—	Not used
4	A/B	Input	Channel 1/2 or High/Low power
5	RSSI	Output	Analog Receive Signal Strength Indicator
6	Supply	Input	DC Power connects here to power unit
7	NC	Output	Receiver Alignment—***DO NOT CONNECT***
8	RD	Output	RS-232 data output from modem
9	TD	Input	RS-232 data input to the modem
10	CTS	Output	RS-232 clear to send output from modem
11	DSR	Output	RS-232 data set ready output from modem
12	—	—	Not used
13	CD	Output	Carrier detect
14	RTS	Input	RS-232 request to send input to modem
15	GND		System ground (power supply and signal)

2.1.1 Pinout Description

Pin 4 (A/B)

Depending on how it is programmed via the programming utility, Pin 4 can either be a Channel A/Channel B selection pin or a High/Low transmit power selection pin. This pin has an internal pullup resistor to +5 V and assumes a high (channel A or high power) state when left unconnected.

Pin 5 (RSSI)

Pin 5 is an analog output whose amplitude is proportional to the signal strength of the received signal. The voltage at this pin varies from about 1.6 VDC for a -130 dBm signal to about 4 VDC for signals at or above -60 dBm.

Pin 6 (Supply)

Pin 6 is the positive power supply input for the modem.

Pin 7 (Receiver Alignment)

Pin 7 is the output pin of the modem IC's input operational amplifier. It is used during alignment to set the receiver gain and DC offset for proper modem IC receiver decoding. This pin must be left unconnected.

Pin 8 (RD Receive Data)

RS-232 data to be received *from* the modem are available at Pin 8. The data are at normal RS-232 levels and are transmitted from the modem to be received by the host computer or other device connected to the modem.

Pin 9 (TD Transmit Data)

RS-232 data to be transmitted *to* the modem should be presented to Pin 9. The data should be at normal RS-232 levels and are transmitted from the host computer or other device to the modem.

Pin 10 (CTS Clear to Send)

This RS-232 output pin is asserted by the modem as a response to an assertion of the RTS pin when it is ready and able to receive data from the host computer or device.

Pin 11 (DSR Data Set Ready)

This RS-232 output pin is asserted by the modem when it is powered-up. It indicates that the modem is actually connected, although not necessarily ready to receive data. The polarity (active low/active high) is programmable via the programming utility.

Pin 13 (CD Carrier Detect)

Pin 13 is asserted by the modem when the receiver has detected a carrier. The RF level for CD assertion is set via the programming utility. Note that the modem demodulation circuitry does not actually use this signal to determine that a valid data packet has been received. The polarity (active low/active high) is programmable via the programming utility

Pin 14 (RTS Request to Send)

This RS-232 input pin is asserted by the host computer or device to indicate that it has data to be transmitted by the modem. If the modem is able to accept the data, the CTS pin will be asserted in response.

Pin 15 (GND Ground)

The system ground common point and negative connection for the power supply and RS-232 signals.

2.2 LED INDICATORS

The Model 20981 UHF Data Radio has two LEDs on the side of the unit, one green RX LED and one red TX LED.

- The GREEN RX LED can be programmed to be illuminated under a variety of conditions. The choices are:
    - Never (Off)
    - Whenever power is applied (Power On)
    - When receiving, whether or not an actual signal is on the frequency (RX Synthesizer Lock)
    - When receiving and an actual data packet is being received (RX Data).

  In typical applications, either RX Synthesizer Lock or RX Data is selected.

- The RED TX LED can be programmed to be illuminated when the modem is transmitting, or to be never illuminated.

3. OPERATION

3.1 CHANNEL SELECTION

The Model 20981 UHF Data Radio supports one channel if the A/B pin (pin 4) is programmed for high/low power and two channels if the A/B pin is programmed as a channel select input. Channel A is set when the A/B pin is activated and the A/B pin is in the logic high state, i.e., above 2.0 VDC or is left unconnected. (There is an internal pullup resistor on the A/B pin.) Channel B is set when the A/B pin is activated and the A/B pin is in the logic low state, i.e., below 0.5 VDC. If the A/B pin is programmed for high/low power, channel A is always selected.

A change in the channel selection in receive will cause the receiver to operate on the new channel. In transmit, however, the channel selection is only checked only at the beginning of a transmission. Changes in channel during transmit will not change the transmit operating channel of the unit until the unit is cycled from transmit to receive and back to transmit.

3.2 POWER SUPPLY VOLTAGE

The supply voltage can be at any voltage between 11 and 16 VDC. Since the module is powered directly from this voltage, the supply should be "clean" and, preferably, regulated. The output power will vary with supply voltage. Switching power supplies can be used, but exercise care so that the output waveform is low noise. Also, the module antenna should never be placed near an unshielded switching power supply.

3.3 CURRENT DRAIN VS SUPPLY VOLTAGE

The current drain of the module is a function of the supply voltage as shown in Table 3.

Table 3. Current Drain vs Supply Voltage

Supply Voltage	Current Drain
Receive Mode	
11.0 V	100 mA
12.5 V	90 mA
16.0 V	75 mA
Transmit Mode	
11.0 V	1.1 A
12.5 V	1.0 A
16.0 V	0.7 A

3.4 DUTY CYCLE/KEY-DOWN LIMITATIONS

The major heat-generating component within the radio is the RF power amplifier, which has a maximum temperature limit that should not be exceeded. In addition, the temperature within the radio itself must be kept below the maximum temperature of the reference oscillator to ensure that regulatory frequency stability limits are observed. As a result, limits on the average transmit duty cycle and the maximum continuous transmitter-on time exist, and depend on the supply voltage and the ambient temperature. These limits are summarized in Table 4 for operation in still air.

Table 4. Transmitter Limits Based on Temperature

Ambient Temperature (°C)	Duty Cycle (%)	Key-Down Time (s)
25	30	45
50	5	10

The operation of the Model 20981 UHF Data Radio in All Weather Inc. AWOS systems will be within these limits.

Blowing air across the unit and/or adding a heat sink to the rear of the unit where the PA module is located can significantly improve the duty cycle/key-down times for other uses.

4. INSTALLATION

The Model 20981 UHF Data Radio has two connectors, a female BNC connector for the RF (antenna) connection and a 15-pin D-subminiature for the data/programming interconnection. Connect the BNC connector to a suitable antenna or RF dummy load or attenuator, depending on the installation. If an antenna is connected, it should be placed at least 3 m (10 ft) away from the radio itself to prevent RF interference. Also, any antenna must present a good 50 Ω RF load (low VSWR) at the operating frequency.

Note that a 1 dB attenuator must be used with All Weather Inc. AWOS systems.

The 15-pin connector is usually used with the M493135-00 programming cable, which provides for DC power connections and a serial connection for programming and for the data to transmitted and received. Figure 1 shows the wiring diagram for this cable.

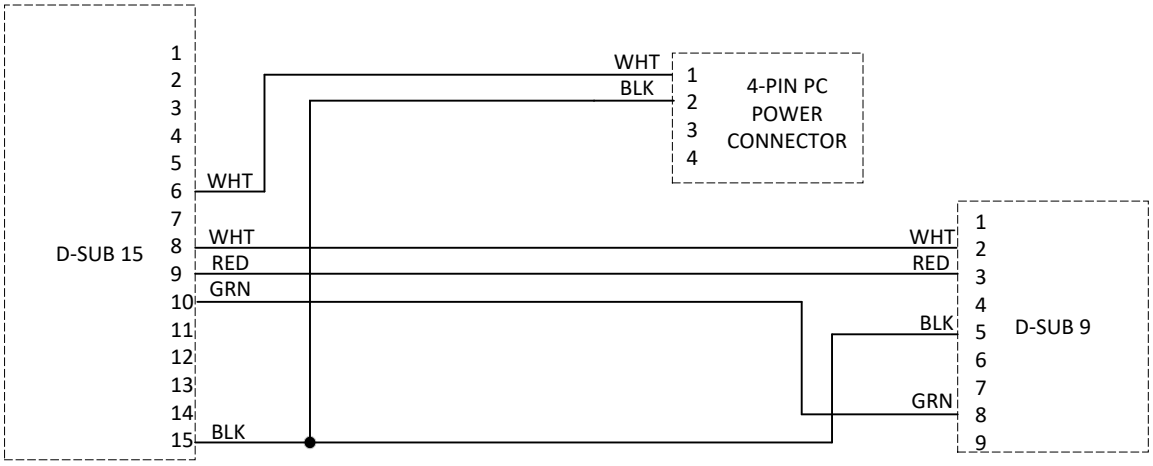


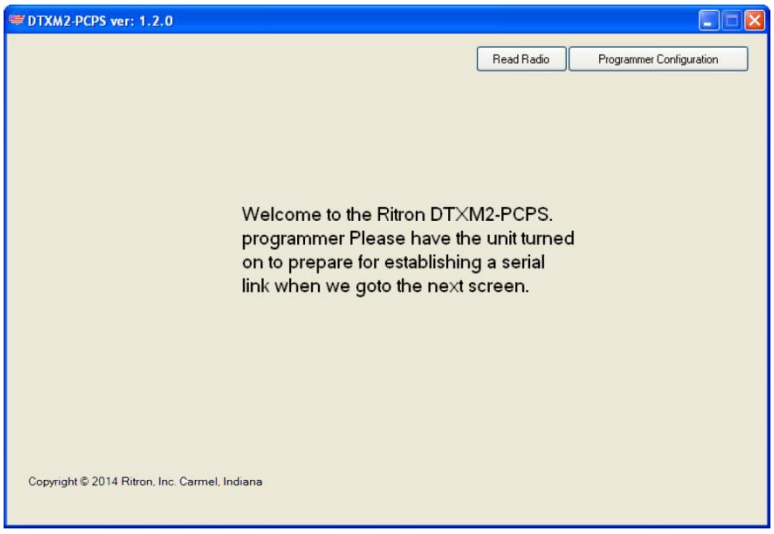
Figure 1. M493135-00 Programming Cable Wiring Diagram

5. PROGRAMMING THE DATA RADIO

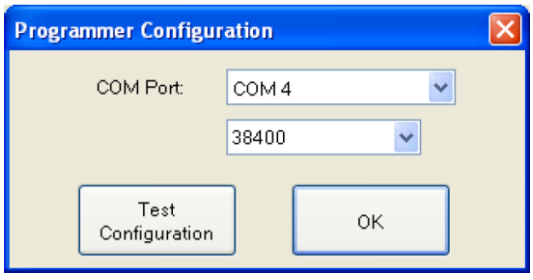
Use the PCPS programming utility to configure and adjust the operating parameters of Model 20981 UHF Data Radio. Load the programming utility on a host computer. If the utility does not install automatically, it can be started manually by running "Setup.exe".

Connect the Data Radio to the host computer with the 9-pin connector (Figure 1). Connect the power connector to a power supply that delivers 11–16 VDC. In programming mode, the current required by the Data Radio is about 150 mA and the power supply should be capable of supplying that current. Note that 2 to 3 A is typical for the transmit mode. It is possible to transmit with the programming utility running, but the power supply must be able to supply the necessary current and a suitable RF load must be provided on the BNC connector.

Once the Data Radio is connected to the host computer and a power supply is connected, open the programming utility and turn the power supply on. The first screen is the "welcome" screen shown below. *Note that the voice parameters are used with the Model 20981 Data Radio.*



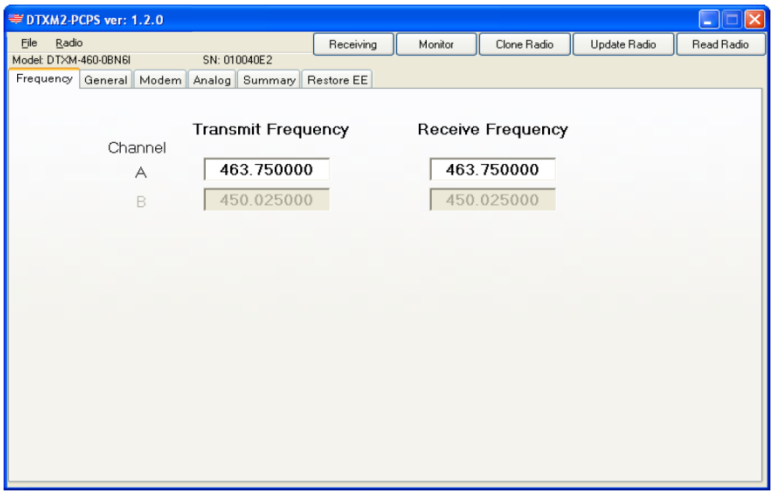
The button at the upper right is the "Programmer Configuration" button and is used to set the serial communications baud rate for communications between the programmer and the host computer. It defaults to 38400 baud, but can be set to other common serial rates. If the host computer baud rate is unknown, click the "Test Configuration" button to auto-detect the baud rate. Click **OK** to confirm the choice of baud rate.



The "Read Radio" button is used to read the contents of the radio into the programmer so that the current configuration of the radio can be observed and edited.

5.1 FREQUENCY TAB

Click the "Read Radio" button. The Frequency tab will open.



This page shows the frequencies programmed into the Data Radio. Depending on how the A/B pin is programmed, either one or two pairs of frequencies will be displayed. Frequencies can be programmed into the device by clicking on the appropriate field and typing in the desired frequencies. The frequencies must be within the operating range of the radio and must be divisible by the synthesizer step size. In addition, there are five other tabs and five buttons that can be selected. These are summarized below.

5.2 OTHER TABS

The tabs show up on all the pages. Clicking on a tab moves one to that page. **Frequency,** as explained above, allows the operating frequencies to be viewed and/or changed.

Other tabs are shown below and their contents will be discussed in detail.

- **General** shows the general operating parameters of the Data Radio.
- **Modem** shows the parameters such as protocol.
- **Analog** shows the parameters of the analog/voice path.
- **Summary** shows all of the Data Radio parameters on one page.
- **Restore EE**-allows the configuration of the programmed Data Radio to be saved.

5.2.1 Buttons

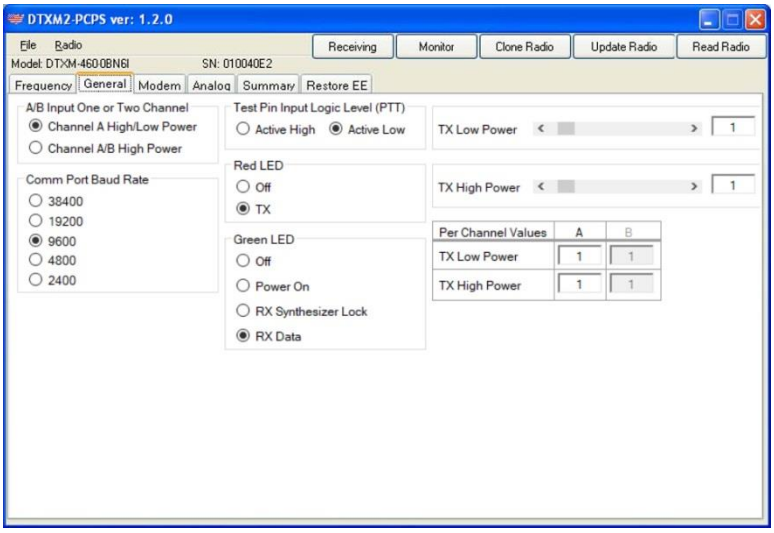
There are five buttons that show up on all the pages.

- **Receiving** is a software (programmer) PTT selection. Selecting this button will put the Data Radio in transmit mode. Selecting this button again will return the radio back to receive.

- **Monitor** is a software (programmer) Monitor selection. Selecting this button will unmute the analog/voice receiving path of the Data Radio. Selecting this button again will return the radio back to normal squelched operation. Note that if unsquelched operation is selected on the Analog page, this button will have no effect.
- **Clone Radio** allows the Data Radio parameters to be copied into another radio.
- **Update Radio** loads the programmer's parameters into the Data Radio. Note that changes made via the programmer are ***not*** saved permanently into the Data Radio until this button is selected. *The radio's behavior will change as changes are made via the programmer, but will be lost on power-down unless, and until, this selection is made.*
- **Read Radio reads** the Data Radio's parameters into the programmer to view and edit.

5.2.2 General Tab

The General tab is shown below.



- **A/B Input One or Two Channel**-Determines the function of the A/B pin. This pin can be used to control the power selection, high or low, for one channel, Channel A, or it can be used to choose between Channel A and Channel B, in which case the output power is high for both.
- **Comm Port Baud Rate d**etermines the baud rate for communications between the data device and the Data Radio. This number should match that shown on the Programmer Configuration screen.

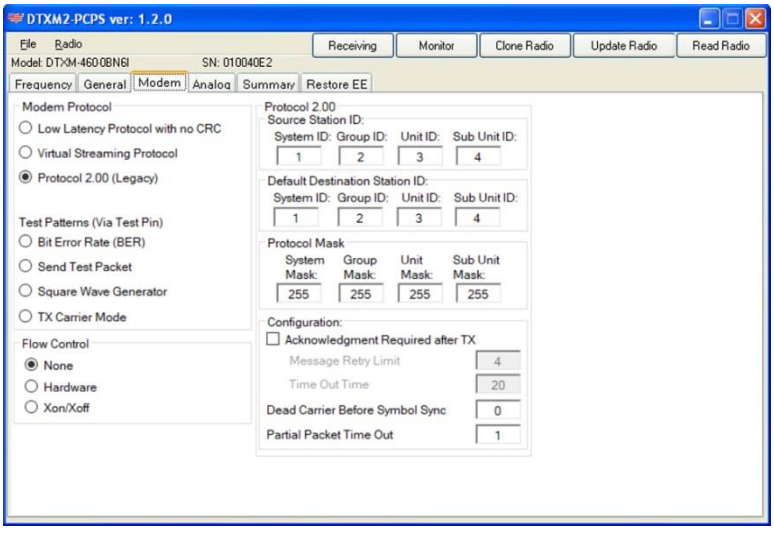
  Note: This is the only selection that saves the current memory configuration to permanent memory.
- **Test Pin Input Logic Level (PTT)** determines the polarity of the test pin. The test pin is used to put the radio in transmit in analog/voice mode or to send test patterns in modem mode. This pin has an internal pullup resistor and thus, assumes a logic high state when not connected. Therefore, active low is the normal, default setting.

- **Red LED** determines the behavior of the red LED indicator. The choices are that it can be set to never be illuminated or illuminated when the radio is transmitting.
- **CD Output Logic Level** determines the polarity of the CD (Carrier Detect) output pin.
- **Green LED** determines the behavior of the green LED indicator. The choices are for it to never be illuminated (off), be illuminated whenever the radio is powered (Power On), when the receiver is locked and receiving (RX Synthesizer Lock), or data/analog information is being received (RX Data). In the latter mode, the indicator would come on whenever one of two conditions is met, the squelch level (carrier detect level) is exceeded, even when Squelch is never muted, or when the receive data has detected a valid data stream.

  Note: The Power On setting disables the Red Led indicator.
- **TX Low Power/TX High Power** allows setting the RF output power for the two states of the low/high power pin. The low-power selection corresponds to the low logic level of the pin while the high-power selection corresponds to the high logic level. Note that the high-power selection does not necessarily have to be greater than the low-power selection. Each is independent of the other and only corresponds to a state of the power select pin.
- **Per Channel Values** summarizes the high and low power settings for the channels used by the Data Radio.

5.2.3 Modem Page

The Modem tab allows the selection of the parameters of the Data Radio mode operation.



- **Modem Protocol** selects the over-the-air protocol. Although there are three choices, only the last one applies to the Model 20981 Data Radio.
  - **Protocol 2.00 (Legacy)** is a very robust packet protocol useful for large data blocks, but not for fast streaming or fast polling.

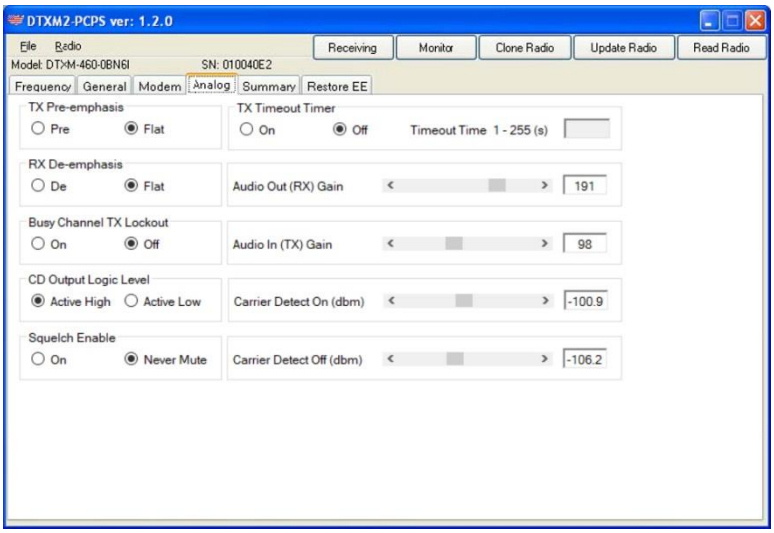
- **Test Patterns (via Test Pin)** Selecting any of the selections in this box will cause a test pattern to be transmitted when the Test Pin (PTT) is active. If no selection is made, activating the Test Pin will cause the Data Radio to transmit in analog/voice mode. The choices are:
    - **Bit Error Rate (BER)** A pin pattern is generated that allows for the computation of the bit error rate, setting deviation, or observing an eye pattern. The pattern is 511 symbols long with no synchronization symbols and repeats continually. It is a maximal length pattern with feedback taps at the 5- and 9-bit positions.
    - **Send Test Pattern** A packet that transmits over and over with a constant data structure. This pattern can be used to test the system in the low latency and streaming modes.
    - **Square Wave Generator** transmits a 400 Hz square wave used to set the deviation and modulation balance during alignment or to hear the transmitted 400 Hz tone on a receiver or radio modem in analog/voice mode.
    - **TX Carrier Mode** is an unmodulated carrier is transmitted.
- **Protocol 2.00** The items is this box select the identification parameters used in the legacy 2.00 protocol.
- **Source Station ID** sets the address of the Data Radio itself. It is made up of 4 parts, from most general to most specific: System ID, Group ID, Unit ID, and Sub-unit ID.
- **Default Destination ID** sets the destination ID of the intended recipient.
- **Protocol Mask** determines how close a mask must exist between the Data Radio's ID and the destination ID in the message before accepting and outputting to the host the message.

  A "1" for any location in the mask requires a perfect match, while a "0" means a "don't care" situation. This is useful for "broadcast", i.e., one unit transmitting to more than one unit situation. Note: In broadcast applications, the "Acknowledgement after TX" selection should NOT be selected to prevent multiple units from responding and interfering with each other. See "Configuration".
- **Configuration**
    - **Acknowledgement required after transmit** When checked, the Data Radio will require an acknowledgement after each transmission or the transmission will be repeated.
    - **Message Retry Limit and Timeout Time** The amount of time in ms that the Data Radio will wait for an acknowledgement and the number of times it will repeat a message can be set in the Message Retry Limits box and the Time Out Time boxes.
    - **Dead Carrier before Symbol Sync** The amount of time in ms that an unmodulated carrier will exist before the beginning of the symbol sync pattern.

- **Partial Packet Timeout** The amount of time in ms of no data from the data device that must exist before a packet is formed and transmitted.

5.3 ANALOG TAB

The Analog tab allows selection of the analog/voice mode parameters.



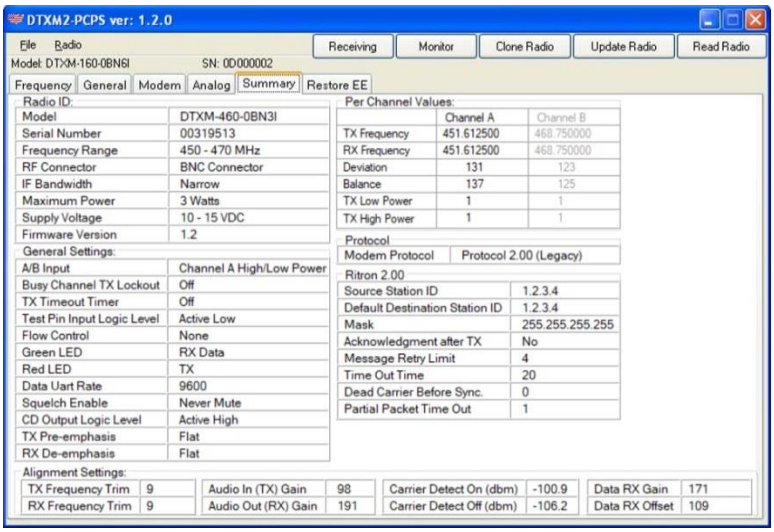
- **TX pre-emphasis** selects whether the external audio signal is pre-emphasized, i.e., has its high-frequency audio content boosted or whether the signal is sent with a flat audio response. Voice signals typically use pre-emphasis.
- **RX de-emphasis** selects whether the external audio output signal is de-emphasized i.e. had its high-frequency content attenuated or whether the signal is outputted with a flat frequency response. Pre-emphasis and de-emphasis are normally used together.
- **Busy Channel TX Lockout** allows a transmission to be inhibited if there is activity on the receive frequency. This would normally be used when the transmitter and receiver operate on the same frequency, and is used to avoid interference to a transmission already in progress. The presence of activity of the channel is determined by signals that exceed the Carrier Detect On setting (see below).
- **CD Output Level** sets the logic level of the Carrier Detect Output pin.
- **Squelch Enable** selects whether signals below the Carrier Detect Off level will be muted (squelched) or whether all signals are allowed to pass to the audio output pins.
- **TX Timeout Timer** selects whether the transmitter in limited in the maximum time that it is allowed to transmit continuously and how long that time would be. This is designed to avoid overheating the transmitter when the Test (PTT) pin is taken active for a long time.
- **Aux Out (RX) Gain s**ets the audio output level for the audio output pins.

- **Aux In (TX) Gain s**ets the gain, not the maximum deviation, for signals at the audio input pins.
- **Carrier Detect On (dBm) s**ets the RF signal level in dBm such that the carrier detect pin will go active and the output audio, if squelch is selected, will go unmute.
- **Carrier Detect Off (dBm) s**ets the RF signal level in dBm such that the carrier detect pin will go inactive and the output audio, if squelch is selected, will be muted.

  Note: *The Carrier Detect On level must be set to be higher (less negative) than the Carrier Detect Off level.*

5.4 SUMMARY TAB

The Summary tab summarizes all the selections from the previous pages.

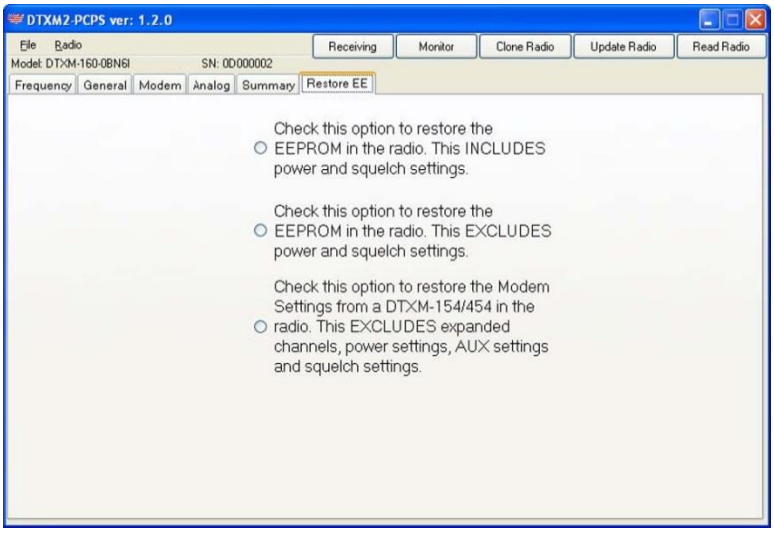


5.5 RESTORE EE TAB

This tab is used to restore saved configurations into other Data Radios. To save a configuration file, select File, Save EE to file, or when the programming utility is closed, select the option to save the file. All parameters are saved. When restored, only select parameters are restored depending on the option selected.

Check one of the three boxes to save the current configuration. Besides not saving a configuration by not checking any option, there are three options.

1. Saving all parameters
2. Saving all except the squelch and RF power level (useful if the Data radio already has power and squelch settings that are to be retained)
3. Convert older DTXM-X54 series products to the configuration of the Series II modems (not used for the Model 20981 UHF Data Radio)


DTXM2-PCPS ver: 1.2.0
File
Radio
Receiving
Monitor
Clone Radio
Update Radio
Read Radio
Model: DTXM-160-0BN6I
SN: 0D000002
Frequency
General
Modem
Analog
Summary
Restore EE
Check this option to restore the EEPROM in the radio. This INCLUDES power and squelch settings.
Check this option to restore the EEPROM in the radio. This EXCLUDES power and squelch settings.
Check this option to restore the Modem Settings from a DTXM-154/454 in the radio. This EXCLUDES expanded channels, power settings, AUX settings and squelch settings.

6. AWOS INSTALLATION

6.1 DCP INSTALLATION

The Model 20981 UHF Data Radio is mounted on a DIN rail on the DCP backplane and is connected to the DCP Sensor Interface board. Refer to the ***Model 1190 DCP User's Manual*** for installation instructions.

6.2 CDP INSTALLATION

The Model 20981 UHF Data Radio is mounted on the back of the CDP front panel and is connected to the motherboard and the power supply. Refer to the ***AWOS 3000 Installation Manual*** for installation instructions.

7. MAINTENANCE

When the Model 20981 UHF Data Radio is installed in an AWOS, periodic maintenance and verification must be carried out according to a schedule that includes monthly, triannual, and annual procedures.

7.1 AWOS MAINTENANCE PROCEDURES

AWOS maintenance procedures are divided into three categories: monthly, triannual, and annual. The maintenance routines are performed according to that schedule.

7.1.1 Monthly Maintenance

7.1.1.1 CDP

1. Inspect the antenna and cables for damage. Repair or replace damaged components.
2. Select the DCP status display screen from the Maintenance Menu, and verify that the displayed ratio of CRC errors to properly received data packets is less than 10%.
3. If the ratio of errors to good data is greater than 10%, adjust the antenna position and verify there are no obstructions between the sensor tower and the receiving antenna. If the problem persists, replace the radio.
4. On the DCP status display screen, verify that the timeout error percentage is less than 5%.
5. If the timeout error percentage is greater than 5% but some data are being received properly, adjust the antenna position and verify there are no obstructions between the sensor tower and the receiving antenna. If the problem persists, replace the radio.
6. If the timeout error percentage is greater than 5% and no data are being received, verify that the CDP radio is powered and that the interface cables are connected properly to the motherboard or computer. If no problem is found, verify that the sensor tower radio is powered and connected properly. If no problem is found, replace both the CDP and DCP (sensor tower) radios.

7.1.1.2 DCP (Tower)

1. Inspect the antenna and cables for damage. Repair or replace damaged components.
2. Inspect the radio. Verify that the Transmit and Receive LEDs flash at 5-second intervals.
3. Select the date and time screen on the DCP keypad. Verify that the date and time are correct and that the time updates at 5-second intervals.
4. If the time is updated less frequently (e.g., every 15-30 seconds or longer) adjust the antenna position and verify there are no obstructions between the tower and the transmitting antenna (located near the CDP). If the problem persists, replace the radio.

7.1.2 Triannual Maintenance

Perform the monthly maintenance. No additional procedures are required.

7.1.3 Annual Maintenance

Annual maintenance and validation both the CDP and the DCP radios consists of the following tests.

- Power level
- VSWR (at the transmitter)
- Frequency
- Deviation

If RF cables must be disconnected when switching between VSWR tests, disconnect the radio power connector before doing so.

7.1.3.1 Power Level

1. Remove power from the UHF radio by disconnecting the power connector.
2. Connect a power meter between the attenuator on the radio BNC connector and the cable to the antenna.
3. Place the 2.5 W, 400–850 MHz frequency element in the power meter. Point the element arrow to the antenna.
4. Reconnect the power connector to restore power to the UHF radio. Measure the forward power on the power meter. This should be approximately 2 W. Enter the value on the Annual Technical Performance Record.

7.1.3.2 VSWR (at transmitter)

1. Replace the power element with a 1 W, 275–450 MHz frequency element with the arrow in the direction of the radio.

   NOTE: The element will be damaged if the arrow is in the direction of the antenna.

2. Measure the reflected power. Enter the value on the Annual Technical Performance Record.
3. Calculate the VSWR using the following equation and the forward power from Section 7.1.3.1, then enter the value on the Annual Technical Performance Record.

$$VSWR = \frac{1 + \sqrt{\frac{reflected\ \ power}{forward\,power}}}{1 - \sqrt{\frac{reflected\ \ power}{forward\,power}}}$$

4.

Sample Calculation:

Reflected power = 0.02 W

Forward power = 2.5 W

$$VSWR = \frac{1+\sqrt{\frac{reflected\_power}{forward\_power}}}{1-\sqrt{\frac{reflected\_power}{forward\_power}}} = \frac{1+\sqrt{\frac{0.02}{2.5}}}{1-\sqrt{\frac{0.02}{2.5}}} = \frac{1+\sqrt{0.008}}{1-\sqrt{0.008}} = \frac{1+0.0894}{1-0.0894} = \frac{1.0894}{0.9106} = 1.1964$$

5.

7.1.3.3 Frequency

1. Replace the power element with the RF sampler element.
2. Connect an RG-58 coaxial cable from the sampler to the frequency meter.
3. Set the frequency meter to "500" MHz range, "fast" gate, and "batt" power.
4. Measure and log the frequency on the Annual Technical Performance Record.

7.1.3.4 Deviation

1. Replace the frequency meter with the deviation meter.
2. Connect the coaxial cable to the RF input on the meter. Set the meter switches to:

Function	FM +
Range	10 kHz
Filter	25–15 kHz
De-emphasis	Off
Power	On

3. Enter the meter reading on the Annual Technical Performance Record.

8. SPECIFICATIONS

Parameter	Specification
Regulatory Approvals	FCC Identifier AIERIT39-46006 Industry Canada Identifier 1084A-RIT394
Frequency Range	450–470 MHz
Channel Width	12.5 kHz
Data Rate	9600 bps
Modulation	4FSK
Channels	2
Operating Bandwidth	20 MHz
Synthesizer Step Size	5.0/6.25 kHz
Emissions Bandwidth	8.0 kHz
Frequency Stability	±1.0 ppm (-30°C to +60°C) ±1.5 ppm (-30°C to +75°C)
Transmitter	
RF Output Power	1–3 W
RF Load Impedance	50 Ω
PTT Attack Time	<10 ms
Spurious and Harmonics	<-25 dBm
Current Drain	1.1 A (max.) @ 1 W 1.6 A (max.) @ 2 W
Receiver	
Sensitivity	0.30 µV (max.) @ 10^{-3} BER
Adjacent Channel Selectivity	>60 dB
Spurious and Image Rejection	>70 dB
IMD Rejection	>67 dB
Squelch Attack Time	<15 ms
Receive Current Drain	<120 mA
Environmental	
Operating Temperature	-35°C to +60°C
Relative Humidity	0–95% noncondensing

Parameter	Specification
Power and Mechanical	
Supply Voltage	11–16 VDC, up to 3 A in Transmit mode
RF Connector	BNC
Power/Data Connector	15-pin subminiature D-type
Dimensions	91 mm L × 58 mm W × 25 mm H (3.6" L × 2.3"W × 1.0"H)
Weight	0.17 kg (6 oz)

9. WARRANTY

Any defect in design, materials, or workmanship which may occur during proper and normal use during a period of 1 year from date of installation or a maximum of 2 years from shipment will be corrected by repair or replacement by All Weather Inc.

All Weather Inc.
1065 National Drive, Suite 1
Sacramento, CA 95818
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Phone: 916.928.1000
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