



XT1

AM FM RDS / RBDS Tuner

User Manual

www.xantech.com

Thank you for purchasing the XT1 Tuner. We take great pride in the design and manufacturing quality products, and are confident that your new XT1 will provide you with many years of enjoyable and trouble-free service. Should you ever have any need to call upon our services, please feel free to contact us at the address shown at the end of this manual or contact the dealer or distributor from whom you purchased this product. Full details of the warranty coverage provided can be found at the end of this booklet.

Important Safety Instructions

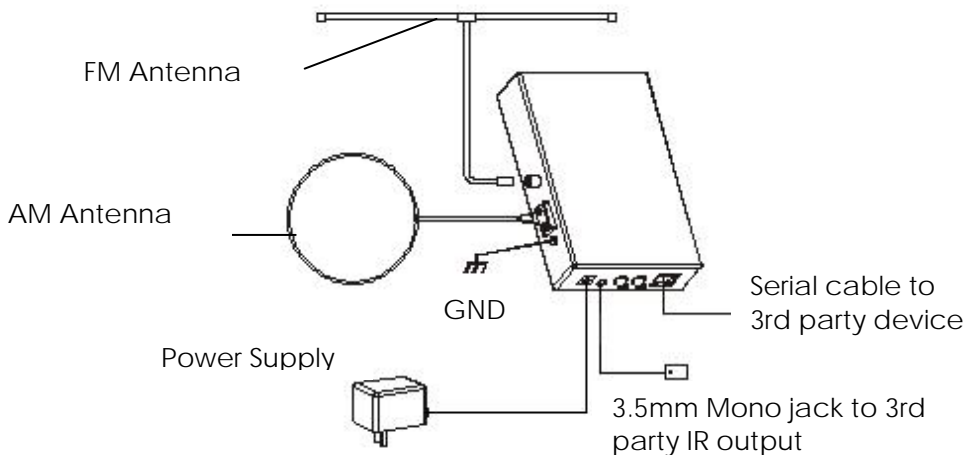
1. ***Important! Please read all the safety and operating instructions shown in this manual before operating this equipment.***
2. Heed all warnings and follow all operating instructions.
3. *Warning: To assure safety during a lightening storm, the XT1 must be grounded, refer to the diagrams on page 4. Also, if the unit is left unattended and unused for long periods of time, it is recommended that you unplug the unit from the wall AC outlet.*
4. Locate the product away from heat sources such as stoves, heat sources, radiators or other appliances including other amplifiers that produce heat.
5. Mount the equipment in a wall or cabinet only as described in this owner's manual.
6. Do not use this equipment near water, in damp locations, or outdoors.

Each XT1 package contains

- XT1 AM/FM Tuner with RDS/RBDS
- IR cable: 3.5mm mono socket - 3.5mm stereo jack
- Serial cable: DB9 female - RJ45 male
- Audio Cable: L/R RCA male to 3.5mm stereo female jack
- Audio Cable: L/R RCA male to L/R RCA male
- Power supply 12VDC 300mA
- FM Dipole Antenna
- AM loop antenna
- User Manual

Optional (sold separately)

- 1U Rack mount kit for up to 3 tuners: Xantech part number 1U3XT1RM



RS232 control

The XT1 can be controlled via RS232. To connect a serial control device, the supplied serial cable should be used. This cable establishes the RS232 communication to and from the tuner.

The pin layout and RS232 protocol can be found in the back of this manual.

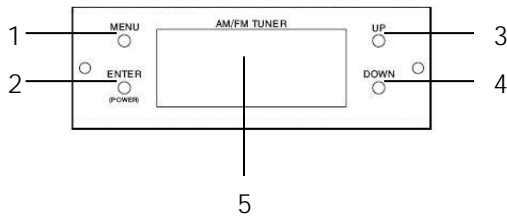
IR Receiver input

To control the XT1 via IR, an IR extender system needs to be used. There is no IR receiver inside the LCD display. To connect an industry standard IR extender system, use the supplied IR cable and plug the stereo jack of this cable into the IR sensor input of the XT1, and use the mono socket to attach the IR extender output to. Tip = IR-SIGNAL, Sleeve = GND.

Antenna's

Position and secure both antennas individually until the clearest sound is heard.

Front Panel Controls



(1) MENU

Pressing this button allows you access to the following functions:

- AM/FM band selection
- Auto/Manual tuning selection
- Scan the preset stations
- Memorize a station
- Set the IR Code.

(2) ENTER (Power)

When plugging in the power transformer the first time, the tuner will automatically turn on. Pressing this button for **4 seconds** will turn the unit ON from standby (sleep mode), or put the unit into standby from its ON state.

(3) UP

Allows for tuning up to higher frequency stations.

(4) DOWN

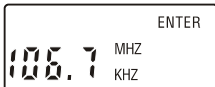
Allows for tuning down to lower frequency stations.

(5) LCD DISPLAY

The display will turn off after approximately 3 to 4 minutes. To turn display ON, simply press the ENTER button.

Tuner Operation

MAKE AM/FM BAND SELECTION



1. Press and release the MENU button until either the ENTER and MHz characters flash, or the ENTER and kHz characters flash.
2. Press the ENTER button until either MHz or kHz stops flashing.
3. Press either UP or DOWN button to obtain MHz or kHz. (**note** – MHz is the FM band and kHz is the AM band)
4. Either wait until the ENTER stops flashing or depress the ENTER button.

EZ Steps:

1. Press MENU once
2. Press ENTER
3. Press UP
4. Press ENTER (or wait 3 seconds)

SELECT AUTO OR MANUAL TUNING



1. Press and release MENU button until AUTO and ENTER flash.
2. Press ENTER button to stop flashing.
3. Press UP or DOWN button to change to a new tuning mode.
4. Press ENTER to switch to the new mode.

EZ Steps:

1. Press MENU twice
2. Press ENTER
3. Press UP
4. Press ENTER (or wait 3 seconds)

LISTEN TO PRESET STATIONS OR SCANS



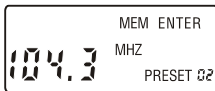
1. Press and release MENU until P-SCAN and ENTER characters flash.
2. Press ENTER.
3. Preset stations or scans will continue to advance until the ENTER button is pressed.

EZ Steps:

1. Press MENU three times
2. Press ENTER
3. When desired station is playing, press ENTER

NOTE. Although the display only shows frequency steps of 0.1MHz, the actual tuning is done with steps of 0.05Mhz. (in EU mode only)

TO PRESET MEMORIES



1. Select a desired station.
2. Press and release MENU button until MEM and ENTER characters flash.
3. Press ENTER button.
4. Select desired PRESET number by pressing UP or DOWN button.
5. Press ENTER button.

EZ Steps:

1. Select desired station
2. Press MENU four times
3. Press UP or Down
4. Press ENTER button

RDS/RBDS INFORMATION

RDS/RBDS information is not shown on the XT1 display and is only available through its RS232 connection.

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Xantech products (go to xantech.com/warranty for model numbers)	Warranty Duration
IR Receivers and IR emitters	Limited lifetime
Remote Control Switchers	Limited lifetime
Modules and Connecting Blocks	Limited lifetime
Accessories	Limited lifetime
Speakers	Limited lifetime
Volume Controls and Speaker Selectors	5 year limited
MRC, BX, ZPR and Commercial Products	2 year limited
Amplifiers	2 year limited
Control Interfaces	2 year limited
Hand Held Remote Controls	1 year limited
SPLCD Product	1 year limited
Source Components (includes XT1)	1 year limited

Specifications

FM

Frequency Range:	88 to 108 MHz (US) 87.5 to 108 MHz (EU)
Antenna Input Impedance:	75 ohm
Usable Sensitivity @30dB S/N:	- 5 dBu (typical)
Signal/Noise ratio - Mono	62 dB A
- Stereo	55 dB A
THD(1kHz) - Mono	0.2 %
- Stereo	0.4 %
Image Rejection:	79 dB
Frequency Response:	50 to 15k Hz
Stereo Separation:	33 dB
Capture Ratio:	2 dB

AM

Frequency Range:	530 to 1700 kHz (US) 525 to 1605 kHz (EU)
Usable sensitivity:	23 dBu
IF rejection:	90 dB
Selectivity:	100 dB
Distortion:	0.5% (typical)
Signal/Noise ratio:	50 dB A
Frequency Response:	50Hz to 3kHz
Power requirement:	12VDC 300 mA
AC voltage for Power supply :	
USA/Canada	120V, 60Hz
Europe	230V, 50Hz

Dimensions: 6"(153mm) D x 4"(102mm) W x 1-1/4" (32mm) H.

Appendix 1

RS232 Protocol

Interface

Baud Rate : 9600 Stop Bit: 1
Data Bits : 8 Parity Bit: none
Transmission: In ASCII codes

Format

<ZoneID><_><ProductID><_><TunerID>_<Command><_><Parameter1><_><Parameter2><_><CR>

- <Zone ID> Is number 00 to 99, a "00" selects all zones.
The maximum number is 99.
Zone ID is factory set at "0", can be reassigned to other number below 99.
- <Product ID> For the XT1, the factory default setting for product ID is 10
- <Tuner ID> Is number 00 to 99, a "00" selects all tuners. Default set to 01
- <Command> Is 1 to N, N may be in one or multiple digits as defined in the first column in the table below
- <Parameter1> None, or is 1 to N, N may be in one or multiple digits as defined in the "Parameter1" column below
- <Parameter2> None, or is 1 to N, N may be in one or multiple digits as defined in the "Parameter2" column below
- <_> The fields are separated by an underscore "_"
- <CR> A character return to terminate the command line
- <Zone ID> If multiple XT1 tuners are used in one application, the Zone ID of each tuner shall be reassigned with a unique number so that each tuner can be controlled individually via the RS232 port. Use command 14 in the following list to program a new Zone ID.

XT1 Command	Purpose	Parameter1	Purpose of Parameter1	Parameter2
1	Power on/off	1	Power off	
		2	Power on	
		3	Toggle power on/off	
2	Band switching	1	AM	
		2	FM	
		3	Toggle between AM/FM	
3	Preset access	1 to N	1 for preset 1, 32 for preset #32	
4	Direct frequency tuning	87..107	Enter the integral part of a FM frequency	00..95
		5..16	Enter the 1st or first two digits of an AM frequency	00..99

5	Auto Memory	1	Start scan from the current frequency and write each station into preset sequentially	
		2	Start scan from FM 87.5MHZ to 107.95 then AM 530 to 1690, write each station into preset sequentially.	
6	RS232 Output	1	Outputs feedback one by one (i.e. on demand)	
		2	Outputs feedback every 0.5 seconds	
		3	Outputs feedback every 1 seconds	
		4	Outputs feedback every 2 seconds	
		5	Outputs feedback every 5 seconds	
7	Preset Scan	1	Scan up preset number to play each preset for 5 sec	
		2	Scan Down preset number to play each preset for 5 sec	
		3	Stop the preset scan	
		4	Move and stop only once at the next preset of higher number	
		5	Move and stop only once at the next preset of lower number	
8	Write/Erase a preset	1	Enter a "0" to erase the current preset shown in the display	01..32
		2	write the frequency into the entered number	
9	Up/Down Tuning	1	Auto tune up frequency	
		2	Auto tune Down frequency	
		3	Manual tune up frequency one step	
		4	Manual tune down frequency one step	
10	Stereo/Mono mode	1	Let Tuner received signal control the mode	
		2	Force the tuner into Mono mode reception (Stereo mode is set each time the auto-tuning is engaged)	
11*	Get frequency	1	Output in ASCII, the band and frequency listening	
	Get Preset number	2	Output in ASCII, the preset number that is displaying	
	Get Tuning mode	3	Output in ASCII, the current tuning in "auto" or "manual"	
	Get Receiving mode	4	Output in ASCII, the current receiving mode in "Stereo" or "Mono"	
	Get Operating Status	5	Output in ASCII, the Frequency Preset number, Tuning Mode, Receiving Mode, Zone ID, IR ID, and Power status	
12	Purge EEPROM	111	Purge the EEPROM and restore it to the default setting	
13	MPU Reset	111	Reset the MPU to default settings	
14	Reserved for future use			

15	Program XT1 Zone ID	888	Program XT1 Zone ID "number"	00..99
		222	Return XT1 Zone ID	
		666	Program XT1 Tuner ID "number"	00..99
		444	Return XT1 Tuner ID	

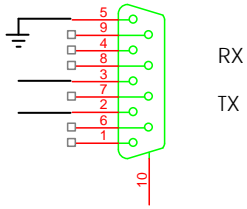
Examples:

- 01_10_00_1_1 Instruct Zone 1 XT1 to power off
- 01_10_06_1_2 Instruct Zone 1 Tuner 6 XT1 to power on
- 01_10_00_1_3 Instruct zone 1 XT1 to power on if it is off, or power off if it is on
- 12_10_00_3_21 Zone 12 XT1 to tune into preset #21
- 03_10_00_4_107_50 Zone 3 XT1 to tune to FM 107.50 MHZ
- 03_10_00_4_99_55 Zone 3 XT1 to tune to FM 99.55 MHZ (The 2nd digit after the decimal is 50K/step tuning for Europe)
- 03_10_00_2_1 Switch band to AM reception
- 03_10_00_4_05_80 Zone 3 XT1 to tune to AM 580 KHZ
- 03_10_00_4_10_00_30 Zone 3 XT1 to tune to AM 1030 KHZ
-
- 01_10_14_6_1 Returns the RDS information of Tuner 14
- 01_10_00_6_4 RDS information is fed to third party device every 2 seconds.
-
- 01_10_00_8_0 Zone 1 XT1 to empty the preset currently displaying
- 01_10_00_8_15 Zone 1 XT1 to write the displayed frequency into preset 15
- 02_10_00_11_1 When in FM 100.05 MHZ, Zone 2 XT1 outputs FM10005 in ASCII string
- 02_10_00_11_5 When in FM 100.05 MHZ, Zone 2 XT1 outputs a complete set of operating data
IFM10005IIPRESET 02IITUNING AUTOIIMODE STEREOIIZONE 02IIIR 1IIPOWER ONI
- 2_10_00_11_2 Simply output "21" in ASCII if the current preset listening is 21
- 00_10_00_15_888_12 Program XT1 Zone ID TO 12
- 00_10_00_15_222 Read Zone ID
- 00_10_00_15_666_40 Program XT1 Tuner ID TO 40
- 00_10_00_15_444 Read Tuner ID

Notes for Programming:

Each time after sending a command to operate a XT1, always pause for 0.5 sec then send command 11 to receive the update data feedbacks from the XT1.

Pin Layout



	RJ45	DB9-Male	DB9-Female	Circuit Item
Pin	1	3	2	TX
Pin	2	2	3	RX
Pin	4	5	5	GND

Appendix 2

Discrete IR HEX Codes

The carrier frequency: 38KHz.

Key	HEX Code	IR Code
AM/FM	90	0000 006D 0000 0021 0156 00AB 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0015 0015 0015 0015 0015 0040 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015
On/Off	60	0000 006D 0000 0021 0156 00AB 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0015 0015 0040 0015 0040 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015
Mem	98	0000 006D 0000 0021 0156 00AB 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015
Auto	F8	0000 006D 0000 0021 0156 00AB 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015
Dir	D8	0000 006D 0000 0021 0156 00AB 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0015 0015 0015 0040 0015 0040 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0015 0015 0040 0015 0040 0015 0040 0015
Up	A8	0000 006D 0000 0021 0156 00AB 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0015 0015 0040 0015 0015 0015 0040 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0015 0015 0015 0040 0015 0015 0015 0040 0015 0040 0015 0040 0015
Down	32	0000 006D 0000 0021 0156 00AB 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0015 0015 0015 0040 0015 0040 0015 0015 0015 0015 0015 0040 0015 0015 0015 0040 0015 0040 0015 0015 0015 0015 0015 0040 0015 0040 0015 0015 0015 0040 0015
Pre-Set	B2	0000 006D 0000 0021 0156 00AB 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0015 0015 0040 0015 0040 0015 0015 0015 0015 0015 0040 0015 0015 0015 0015 0015 0040 0015 0015 0015 0015 0015 0040 0015 0040 0015 0015 0015 0040 0015
ST/MO	58	0000 006D 0000 0021 0156 00AB 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0040 0015 0015 0015 0040 0015 0040 0015 0040 0015 0015 0015 0015 0015 0015 0015 0015 0015 0040 0015 0015 0015 0015 0015 0015 0015 0040 0015 0040 0015 0040 0015



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