

F M 0 6 T X

6W PLL FM TRANSMITTER

User's Guide

(Please read carefully before using for the first time!)

FM06TX is an FM transmitter. It achieves high stability thanks to the PLL-based design.

To operate you must first connect power DC 13.8V-15V using an appropriate power transformer.

To avoid damage, always operate the unit with the RF Out connected to an antenna, or a 'dummy load'.

Connect your audio source to the corresponding Left and Right RCA jacks. The unit will combine the stereo signals to a mono channel.

Please note that the firmware in the unit covers several different models (both AM and FM). Therefore, some options may not be available in your unit.

O P E R A T I O N

FM06TX features a 20-character by 4-line LCD and a 4-button keyboard. When powered up, the LCD displays a brief version and copyright message followed by the current transmission frequency.

The keyboard buttons (**MENU**, **UP**, **DOWN**, and **ENTER**) which, depending on the keyboard type, may appear verbally or symbolically, are described next:

- [■]/[Menu]** Acts as Menu or Escape. It cycles through the possible menu screens (*sequence shown farther below*) or selections within a single menu item.
- [↑]/[Up]** Acts as Up. It cycles through the possible choices in a forward or upward direction. *Menus with only two possible choices use the [●] key instead to toggle between the two options.*
- [↓]/[Down]** Acts as Down. It cycles through the possible choices in a reverse or downward direction. *Menus with only two possible choices use the [●] key instead to toggle between the two options.*
- [●]/[Enter]** Acts as Enter. It enters the Settings screen from any screen. If inside the Settings screen, it enters the editing mode for the specific item the cursor is currently on. If editing an item, it stops the editing and accepts the changes. For menu items that have only two possible options (e.g., toggle switches), pressing [●] toggles the current option. *Note: Some choices may become active immediately when selected with the [↑]/[↓] buttons while most options (e.g., frequency) are activated only by pressing [●].*

I N F O R M A T I O N A L I T E M S

All pages show a combination of at most four of the following predefined informational items.

FRQ: A line which shows the current OnAir/OffAir status, the frequency of operation in MHz and the indicator [ST] when operating in Stereo Mode (only if the optional stereo encoder board is installed, non-functional otherwise). The OnAir indicator is always steady. The OffAir indicator always blinks to draw your attention.

FWD: Shows the measured forward power in Watts. The measurement is based on average (AVG) or peak-envelope-power (PEP) reading, which is settable by the user in the Settings Screen, but it normally should not be changed from the manufacturer's preset value.

FWD measurements are based on the 'PowerMeterMode' setting of either 'AVG' or 'PEP'.

REF: Shows the measured reflected power in Watts. The measurement is based on average (AVG) or peak-envelope-power (PEP) reading, which is settable by the user in the Settings Screen, but it normally should not be changed from the manufacturer's preset value.

Next to the reflected power, an Alert message may be displayed, whenever the reflected power goes above the 'Lim REF' setting, which may be changed from the manufacturer's preset value by the user. The ALERT message blinks to draw your attention. If you have turned the 'Sounding' setting to 'On' a very discrete ticking sound will be heard while the ALERT message flashes. If you have also turned the 'Loudness' setting to 'On', the sound will be much louder and easily noticeable from some distance.

REF measurements are based on the 'PowerMeterMode' setting of either 'AVG' or 'PEP'.

Mod: Shows the modulation level as peak percentage (0 to 120%) and bargraph.

Date: Shows the current date as Day-of-week, date, month, and year.

Time: Shows the current time as hours, minutes, and seconds.

Temp: Shows the current LCD backlight level as percentage followed by the internal MCU temperature in approximate degrees Celsius and Fahrenheit.

IMPORTANT NOTE: When there is excessive reflected power the RF power will not be disabled unless the device is currently in a page where the REF reading is shown. Pages where the REF reading does not show will not automatically go into ALERT / OffAir mode when the REF reading exceeds the 'Lim REF' value.

M E N U S E Q U E N C E

Menus show a different collection of informational items.

The menu sequence is shown below. Menus do not show the actual titles. The titles below are indicative of the function and may appear slightly different on the actual LCD.

MAIN | TEMPERATURE | FORWARD | REFLECTED | MODULATION

MAIN Displays FRQ, FWD, REF, and Mod.

Press [**↑**] to increase the RF output level, or to re-attempt OnAir after auto-OffAir due to excessive reflected power.

Press [**↓**] to decrease the RF output level.

Note: If the OffAir setting is saved to internal memory, then every time the device is restarted, its RF output will be disabled, unless dictated otherwise by the saved schedule.

TEMPERATURE Displays FRQ, Date, Time, LCD backlight percentage, and Temp.

Press [**↑**] to increase the LCD background lighting from off (0%) to full (100%) in 10% increments.

Press [**↓**] to decrease the LCD background lighting from full (100%) to off (0%) in 10% decrements.

FORWARD Displays FRQ, Date, Time, and FWD.

Press [**↑**] to turn the status to OnAir, or to re-attempt OnAir after auto-OffAir due to excessive reflected power.

Press [**↓**] to turn the status to OffAir.

Note: If the OffAir setting is saved to internal memory, then every time the device is restarted, its RF output will be disabled, unless dictated otherwise by the saved schedule.

REFLECTED Displays FRQ, Date, Time, and REF.

MODULATION Displays FRQ, Date, Time, and Mod.

S E T T I N G S M E N U

FRQ

Determines the frequency of operation. The frequency is adjustable with 10KHz step from 87.50 MHz to 108.00 MHz (*special versions may have a different range*). If a number outside the allowed range is entered, it will be brought to the closest range limit.

Mode

Press [**●**] to toggle the mode between STEREO and MONO. Stereo is compatible with mono receivers so operating at Stereo will not affect reception from typical mono receivers. *The stereo option is only functional if the optional stereo encoder board is installed.*

Sounding

This is meant for units equipped with a buzzer. It is non-functional in this unit.

Loudness

This is meant for units equipped with a buzzer. It is non-functional in this unit.

Max FWD

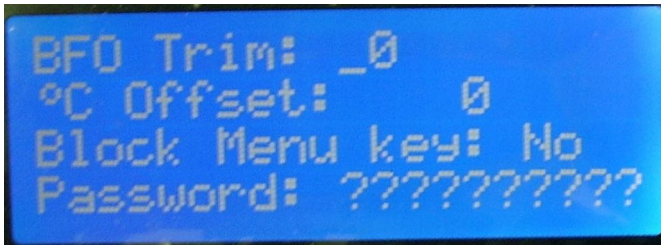
Defines the Maximum Forward power (*in Watts*).

Max REF

Defines the Maximum Reflected power (*in Watts*).

PowerMeterMode

For the FM version, this is fixed at AVG (average).

**BFO Trim**

This is non-functional for the FM version.

°C Offset

This setting defines an offset for temperature reading. Adjust so that the temperature reading is correct. This is normally preset at the factory.

Block Menu key

Press [●] to toggle the option that enables/disables the Menu key for changing thru the various display screens. This is useful if one wants to lock the display to a single screen.

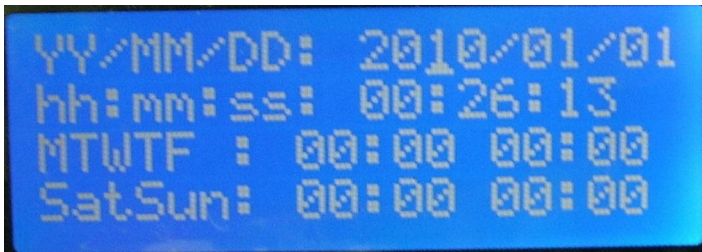
Password

Defines a password for accessing the Settings Screen. The password is 10 characters long and it's made of either spaces or upper case alphabetic characters. There are $27^{10}-1$ possible passwords.

When the password is all spaces, it is effectively disabled.

The password protection is useful for locking all settings from unauthorized changes. If used in combination with the 'Block Menu key' option above, it will lock the display to a screen that the user cannot override.

IMPORTANT NOTE: Make sure you enter the password carefully to avoid mistakes that will lock out. The password is always visible when the screen that contains it is shown.

**YY/MM/DD**

Allows editing the Year (YY), Month (MM), and Date (DD) for the built-in real-time clock.

hh:mm:ss

Allows editing the Hours (hh), Minutes (mm), and Seconds (ss) for the built-in real-time clock.

MTWTF

Defines an optional schedule for workdays (Monday thru Friday).

SatSun

Defines an optional schedule for weekends (Saturday and Sunday).

Hint: Pressing [■] while editing a clock item will zero the item.

D E T A I L E D D E S C R I P T I O N O F V A R I O U S S E T T I N G S
Item Editing Mode

Item Editing Mode is indicated by a full-size blinking cursor. When exiting the item editing mode back to Settings Screen item selection mode the cursor changes to a non-blinking solid underline.

Clock

The only required use for the clock is when schedules are defined (see below). You do not need to set the clock if schedules are not used. An unset clock will start counting from January 1, 2010 00:00:00; you may use this to know how long your transmitter has been continuously on. The clock will automatically switch from Normal to DST based on the EU rules (i.e., last Sunday in March from Normal to DST and last Sunday in October from DST to Normal, at 3:00am). This may be different from rules in other parts of the world.

When in clock editing mode the blinking cursor appears on the LCD at the position to edit next. Use [↑]/[↓] to change the current element (e.g., hour), or [■] to clear the current element value to zero. When done editing, press [●] to accept the changes, and exit the editing mode returning back to the clock display mode. The clock will continue running with the new settings.

WARNING: The clock is lost when the unit is turned off, or the power supply is momentarily lost. This is no problem for normal operation unless schedules are defined. In that case, it is presumed that you make sure a backup battery properly backs the clock's power.

MTWTF schedule Allows editing of the daily schedule for automatic RF Output On/Off switching. The daily schedule is effective only for weekdays except Saturday and Sunday (which are controlled separately by the SatSun schedule). To edit the current schedule, you must enter the schedule-editing mode by pressing [●]. When in schedule editing mode the blinking cursor appears on the LCD at the position to edit next. Use [↑]/[↓] to change the current element (e.g., hour), or [■] to clear the current element value to zero. The left-hand-side time is for the On Time while the right-hand-side time is for the Off Time. When done editing, press [●] to accept the changes, and exit the editing mode. When exiting the edit mode, the start and end times will be put in the correct order so that the start time is always before the end time.

If you need to disable the current schedule (so that the unit operates full time in the inherited RF Output state during the corresponding days for the current schedule), you need to set both the On Time and the Off Time to zeros. The new settings will be effective immediately.

SatSun schedule Defined in the same way as the MTWTF schedule (see above), except that it applies to Saturdays and Sundays only.

Exiting the Setting Screen automatically saves any changes to an internal non-volatile memory. These will be the settings used when FM06TX is powered next time.

Important note: Current clock is lost when the device is powered off (or if there is any loss of power supply), but any saved Daily or Weekend schedules aren't. This means when the unit is powered up again (with an incorrect clock setting), the schedules will appear to be random! Do not use schedules if some form of UPS doesn't protect your device.

All keyboard buttons auto-repeat if held pressed. This is useful mostly for the [↑] or [↓] buttons so you can quickly locate a different value. While selecting from any list in a menu, if you keep the button continuously pressed, the speed will increase from normal to faster. If while searching in faster speed you happen to go beyond the selection you want, you can use the opposite direction ([↑]/[↓]) button from the one you were using to go back, either continuously or one at a time.

A U D I O L E V E L A D J U S T

Although the unit is factory trimmed.

It is possible that your audio source produces a higher or lower level signal than what's expected.

A good method to correctly adjust the audio level is described below:

Turn the RF output level to the minimum non-zero value (from the LCD menu).

Start by connecting an audio source at a nominal level to the appropriate inputs. Both inputs should be given the same signal (monophonic) at the same time. It's better if you can supply a steady 1KHz tone from your audio source. Next, increase or decrease the level of your audio source until the Modulation reading (Mod) on the LCD shows approximately 100%. Stop the 1KHz audio generator from the source and connect your actual program audio with a level that will not exceed the level used with the 1KHz tone when you reading Modulation of 100%. Nevertheless, it's possible for the program audio to reach 115% momentarily during peaks but it's best to keep it as close as possible to 100% as your compressor allows.

As with all FM broadcasts, it's recommended that you use compression on the audio program before it enters the transmitter. The transmitter has a built-in pre-emphasis for FM, and if using some audio processor with its own pre-emphasis setting, you must have it disabled.

R F O U T P U T L E V E L A D J U S T

It is recommended that the following procedure be followed after the audio level has been set (see above).

FM06TX has been set at the nominal RF output level before shipping. There is built-in protection from VSWR in case someone turns it on without first having connected an appropriate load or antenna.

First, attempt to tune the antenna with unmodulated carrier, so that it has the least VSWR possible. Provided the antenna is correctly tuned for the transmission frequency and it appears as a 50ohm load at the transmitter's output, we may start increasing the output level of the transmitter up to the desired level. This setting must be done from within the Main screen (which shows both FWD and REF) and without having any modulation on the transmitter.

You should increase the output power up to point we read 6W. The transmitter may be able to output up to 8W. Nevertheless, this extra output power should only be used in case we need to overdrive an amplifier.

VERY IMPORTANT NOTE, READ CAREFULLY

This device is a high power FM transmitter. Use of this device may be in violation of local laws/regulations, depending on your region. If unsure, please check with your local telecommunications authorities. Under no circumstances should it be used in violation of any such laws/regulations. The responsibility for legal/proper usage rests solely on you!

For proper operation, it must be connected to a 500hm load or to a tuned antenna capable of accepting power of at least 10W.

Thank you for purchasing the FM06TX by ASPiSYS Ltd.

Technical Specifications

Subject to change without notice

RF Output Frequency	87.50 to 108.00 MHz (Special versions may vary according to requirements)
Minimum Step	10 KHz
Frequency Accuracy	+/- 500Hz max. (PLL)
RF Output Level	6W @50Ω
Output Impedance	50 Ω
Harmonics (out-of-band)	-60 dBc
RF modulation	FM (Mono, or Stereo System using external Stereo encoder)
Input Level	0.25V up to 2.5V p.p. (adjustable)
Input Impedance	10KΩ unbalanced
Pre-emphasis	75 μS or 50 μS (according to country system)
Total Harmonic Distortion	<0.2% @ 1KHz
Operating Voltage	13.8-15VDC at 1.3A max.



For technical support email support@aspisys.com, or write to:
 ASPiSYS Ltd., P.O.Box 14386, Athens 115 10, Greece (EU), or call: (+30) 210 771-9544 FAX: (+30) 210 771-4983.
 We are in the GMT+2 time zone.

