

# F A S M 1 S

## PLL FM TRANSMITTER

### *User's Guide*

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



## 1. Preliminary Instructions

This manual is written as a general guide for those having previous knowledge and experience with this kind of equipment, and who are conscious of the risks connected with the operation of electrical equipment. It is not intended to contain a complete statement of all safety rules which should be observed by personnel in using this or other electronic equipment.

The installation, use, and maintenance of this piece of equipment involve risks both for the personnel performing them, and for the device itself that shall be used only by trained personnel.

ASPiSYS Ltd doesn't assume responsibility for injury or damage resulting from improper procedures or practices by untrained/unqualified personnel in the handling of this unit. Please observe all local codes and fire protection standards in the operations of this unit.

**WARNING:** Always disconnect power before opening covers or removing any part of this unit. Please observe all local codes and fire protection standards in the operations of this unit.

**WARNING:** This device can irradiate radio frequency waves, and if it's not installed following the instructions contained in the manual and local regulations it could generate interferences in radio communications. This is a "CLASS A" equipment. In a residential place this equipment can cause interference (RFI). In this case the user may be requested to take whatever necessary measures to correct the situation.

ASPiSYS Ltd reserves the right to modify the design and/or technical specifications of the product and this manual without notice.

## 2. Warranty

Any product by ASPiSYS Ltd is covered by a 24 (twenty-four) month warranty. For components the original manufacturer's warranty applies. ASPiSYS Ltd extends to the original end-user purchaser all manufacturers warranties which are transferrable and all claims are to be made directly to ASPiSYS per indicated procedures. Warranty shall not include:

- Re-shipment of the unit to ASPiSYS for repair purposes
- Any unauthorized repair/modification
- Incidental/consequential damages as a result of any defect
- Nominal non-incident defects
- Re-shipment costs or insurance of the unit or replacement units/parts

Any damage to the goods must be reported to the carrier in writing on receipt of the shipment.

Any discrepancy or damage discovered subsequent to delivery, shall be reported to ASPiSYS Ltd within 5 (five) days from delivery date.

To claim your rights under this warranty, you should follow this procedure:

1. Contact the dealer or distributor where you purchased the unit. Describe the problem and, so that a possible easy solution can be detected. Dealers and Distributors are supplied with all the information about problems that may occur and usually they can repair the unit quicker than what the manufacturer could do. Very often installing errors are discovered by dealers.
2. If your dealer cannot help you, contact ASPiSYS Ltd and explain the problem. If it is decided to return the unit to the factory, ASPiSYS Ltd will mail you a regular authorization with all the necessary instructions to send back the goods;
3. When you receive the authorization, you can return the unit. Pack it carefully for the shipment, preferably using the original packing and seal the package perfectly. The customer always assumes the risks of loss (i.e., ASPiSYS is never responsible for damage or loss during transport) until the package reaches ASPiSYS premises. For this reason, we suggest you to insure the goods for their full value. Shipment must be effected C.I.F. (PREPAID) to the address specified by ASPiSYS Ltd service manager on the authorization

**DO NOT RETURN UNITS WITHOUT OUR PRIOR AUTHORIZATION AS THEY WILL BE REFUSED!**

4. Be sure to enclose a written technical report where mention all the problems found and a copy of your original invoice establishing the starting date of the warranty. Replacement and warranty parts may be ordered from the following address. Be sure to include the equipment model and serial number as well as part description and part number.

ASPiSYS Ltd  
Avlidos 26 b  
ATHENS 11527  
GREECE  
(Tel. +30 210 7719544)

### 3. First Aid

The personnel employed in the installation, use and maintenance of the device, shall be familiar with theory and practice of first aid.

#### 3.1 Treatment of electrical shocks

##### 3.1.1 If the victim is not responsive

Follow the A-B-C's of basic life support.

- . Place victim flat on his back on a hard surface.
- . Open airway: lift up neck, push forehead back (1)



1

- . Clear out mouth if necessary and observe for breathing
- . If not breathing, begin artificial breathing (2): tilt head, pinch nostrils, make airtight seal, four quick full breaths. Remember mouth to mouth resuscitation must be commenced as soon as possible.



2

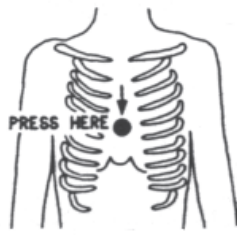
- . Check carotid pulse (3); if pulse is absent, begin artificial circulation (4) depressing sternum (5).



3



4



5

- . In case of only one rescuer, 15 compressions alternated to two breaths.
- . If there are two rescuers, the rhythm shall be of one breath each 5 compressions.
- . Do not interrupt the rhythm of compressions when the second person is giving breath.
- . Call for medical assistance as soon as possible.

##### 3.1.2 If victim is responsive

- . Keep them warm.
- . Keep them as quiet as possible.
- . Loosen their clothing (a reclining position is recommended).
- . Call for medical help as soon as possible.

#### 3.2 Treatment of electrical Burns

##### 3.2.1 Extensive burned and broken skin

- . Cover area with clean sheet or cloth.
- . Do not break blisters, remove tissue, remove adhered particles of clothing, or apply any salve or ointment.
- . Treat victim for shock as required.
- . Arrange transportation to a hospital as quickly as possible.
- . If arms or legs are affected keep them elevated.

If medical help will not be available within an hour and the victim is conscious and not vomiting, give him a weak solution of salt and soda: 1 level teaspoonful of salt and 1/2 level teaspoonful of baking soda to each quart of water (neither hot nor cold).

Allow victim to sip slowly about 4 ounces (half a glass) over a period of 15 minutes.

Discontinue fluid if vomiting occurs. **DO NOT give alcohol.**

##### 3.2.2 Less severe burns

- . Apply cool (not ice cold) compresses using the cleansed available cloth article.
- . Do not break blisters, remove tissue, remove adhered particles of clothing, or apply salve or ointment.
- . Apply clean dry dressing if necessary.
- . Treat victim for shock as required.
- . Arrange transportation to a hospital as quickly as possible.
- . If arms or legs are affected keep them elevated.

### 3. General information

**FASM1S-xxx** is an FM analog broadcasting exciter / transmitter for the **87.5 – 108MHz** band. It achieves high stability thanks to the latest technology PLL-based design. It has also an embedded FM STEREO Encoder circuit, to provide a total solution for any broadcaster. Power levels are denoted from the suffix numbers after the **FASM1S**. For example **FASM1S-250** is the 250W Nominal RF output model (capable to work up to 300W max) & the **FASM1S-500** is the 500W Nominal RF output model (capable of up to 600W max output).

To operate you must first connect power 230VAC (or, via internal selection, it can work with 115VAC).

To avoid damage, always operate the unit with the RF Out connected to an antenna with  $Z = 50 \text{ Ohm}$ , or a 50 Ohm 'dummy load' that can withstand the maximum power level of your transmitter. **NEVER USE IT WITHOUT A 50 OHM LOAD AT THE RF OUTPUT!**

**FASM1S-xxx** contains a low-pass filter that reduces the harmonic emissions to below the limits allowed by international regulations (CCIR, FCC or ETSI), and can therefore be used as a transmitter connected directly to the antenna. Outstanding audio features this device has are low distortion and intermodulation values and the high signal to noise ratio in mono operation.

Another important feature of the **FASM1S** is its great simplicity of construction and use. The **FASM1S** was designed to be modular. Its various functions are run from modules directly connected to each other with male and female connectors or with flat cables ending in connectors. This type of design makes maintenance operations and any required module replacement easier. The RF power section uses one high power double MOSFET able to deliver 300W.

The working frequency is assured by a thermally-compensated reference oscillator working within a phase-locked loop (PLL). The **FASM1S** reaches frequency lock at any selected frequency in less than 30 seconds.

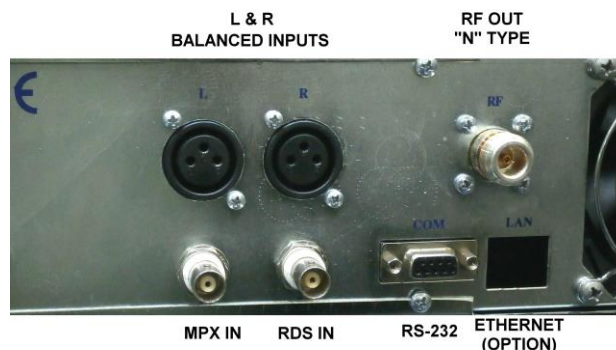
It has also separate audio inputs for balanced & unbalanced AF signals, so there is no need to make any "balanced to unbalanced modification" to your studio wiring. Just connect your audio source to the corresponding Left and Right inputs (either **front panel BNC jacks for unbalanced** or at the **XLR rear panel connectors for balanced signals**). The unit will encode the stereo signals from either of them to a stereophonic MPX FM signal or, if selected, to a standard mono transmission.

Please note that the firmware in the unit covers several different models. Therefore, some options may not be available in your unit.

*IMPORTANT: To prevent wrong settings before reading the manual, the unit may be initially set to the word **ASPISYS** so that you may not adjust the settings without knowing the password. If you wish to remove or change the password, see the corresponding section.*

*Due to the continuously evolving firmware, it's possible that some of the screen shots are not exactly the same on your unit.*

On rear panel are the IEC type AC Mains connector, balanced audio input XLR connectors, the RF output "N" type female connector, telemetry RS-232 connector and two BNC inputs for modulated signals on subcarriers from external stereo encoders and for RDS (Radio Data Systems) transmission.



For FASM1S-500 there is no need to change any internal switch as it accepts 85-265VAC directly. For FASM1S-300, some serial numbers have a PSU with an internal voltage selector that allows the use of the transmitter with different AC mains voltage. Please ask **ASPISYS Ltd** before attending to use the transmitter in a different country than the one for which it was ordered.

#### 5.1 Preparation

Unpack the exciter, and before doing any other operation, be sure it has not been damaged during transport. In particular check that all connectors are in perfect condition.

Check that the **FASM1S-xxx** switch is in the "OFF" position. The exciter has no other switches except the front panel main switch for powering up the unit, and when off, it completely interrupts the mains power supply.

Connect the RF output of the exciter to the antenna cable or to a fictitious load able to dissipate the power generated by the **FASM1S**

**WARNING:** In case the load is not present, don't touch the RF output connector during the equipment operation to avoid electric shock and electrocution.

Connect the mains cable to the proper VDE base, placed on the rear panel.

**WARNING:** It is crucial that the mains system being provided with grounding to ensure both the operator's safety and correct operation of the equipment.

Connect the audio cable and RDS/SCA of the signal source to the proper input connectors of the **FASM1S**



## 5.2 Use of the transmitter

Turn ON the front-panel switch. The self-illumination of the switch should light, showing that AC mains voltage is present. Now you are ready to operate the FASM1S as follows:

### OPERATION

FASM1S front panel features a 20-character by 4-line LCD and a 4-button keyboard, aside the 2 BNC AF inputs. 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:

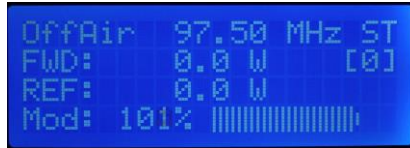
- [■] / [Menu]** Acts as **Menu**, or **Escape**. It cycles through the possible menu screens (*sequence shown farther below*) or selections within a single menu item.
- [↑] / [Up]** Acts as **Up**. It cycles through the possible choices in a forward or upward direction. *Menus with only two possible 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 [●].*

### INFORMATIONAL ITEMS

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**. The **OnAir** indicator is always steady. The **OffAir** indicator always blinks to draw your attention.



**Note:** The unit may go **OffAir** automatically based on certain conditions. For example, excessive reflective power (over the pre-set limit) will cause the transmitter to go to **OffAir** mode.)

While keeping the Up/Down button pressed, an **[>]** or **[<]** indication will appear.



When the output level is at its highest limit, **[H]** will appear, and when it is off, **[O]** will appear.



**MOD:** This screen looks the same as the **FRQ** screen with one exception. Instead of the REF line (3<sup>rd</sup> line), a modulation adjustment bar appears.

Modulation adjustment is possible by pressing the **Up/Down buttons** until the desired modulation is achieved. The current level is indicated by a bar-graph, while the actual modulation is displayed on the 4<sup>th</sup> line as with the FRQ screen.

**FWD:** Shows the measured forward power in Watts. The measurement is based on average (AVG) or peak-envelope-power (PEP) reading (**only for AM systems**), 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'.

The brackets [ ] next to the **FWD** reading is used to display the status while turning the RF output level Up/Down (see the FRQ screen description). In previous versions of the firmware, a number appeared inside the [ ] which was a rough indication of the currently selected output level but since this number did not have any linear correspondence with the actual output level, it was found to be confusing for many users, and so it was replaced with a more intuitive method of showing when the RF output level is being adjusted. The RF output level can only be seen by the actual **FWD** measurement.

**REF:** Shows the measured reflected power in Watts. The measurement is based on average (AVG) or peak-envelope-power (PEP) reading (**only for AM systems**), 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.

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 as bar graph. The **100% reading is set for +/-75 KHz FM deviation**

**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.

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**M E N U   S E Q U E N C E**

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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 (shipping status) 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 [↑] until the desired level is shown to turn the status to **OnAir**, or to re-attempt **OnAir** after auto-**OffAir** due to excessive reflected power.

Press [↓] until zero is shown within the brackets 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**.

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**S E T T I N G S   M E N U**

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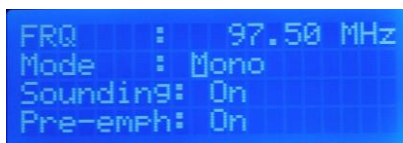


**FRQ**

This setting defines the frequency of operation. The frequency is adjustable in 10 KHz steps 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**.



For Stereo: Connect Left and Right audio at the front panel BNC, or at the rear XLR/Canon.

For Mono: Connect left and right audio as above (left-right order is not important) and internally it will combined into MONO if it is set from the menu. **NOTE:** this setting (MONO) also works when you want to connect an external stereo encoder (to BNC-1), and an optional RDS encoder (to BNC-2).

**ATTENTION:** An RDS encoder while using the internal stereo encoder is not possible. You can only use an RDS encoder with an external stereo encoder.

**The stereo mode setting is only relevant to the internal stereo encoder. To use an external stereo encoder, this mode should be set to MONO that routes the 2 BNC inputs (MPX ext/MONO & RDS inputs) of the rear panel to the modulation path of the transmitter, while it disables both rear panel XLR balanced and the front panel BNC unbalanced AF inputs.**



**Sounding**

This is meant for units equipped with a buzzer. When an **ALERT** shows, this setting controls whether the buzzer will be enabled or disabled.

**Pre-emph(asis)**

When in internal stereo mode, it enables or disables the pre-emphasis.

**Max FWD**



It defines the Maximum Forward power (*in Watts*).

**Max REF**

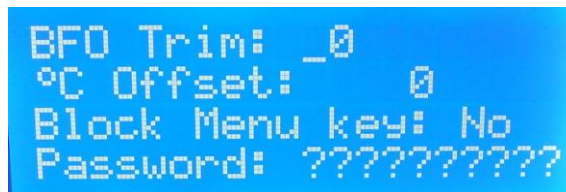
It defines the Maximum Reflected power (*in Watts*).

**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 optional offset for the 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. First select the screen you want to be locked, and then enter the settings menu and change this option to 'Yes'.

**Password**

This setting defines an optional password for accessing the Settings Screen. The password is up to 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 field shows '???????????' it is disabled, and no password will be required to enter the settings menu.

The password protection is useful for locking all settings (e.g., operating frequency) 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. Make sure no one is around when viewing/changing the password.



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YY/MM/DD: 2012/01/01
hh:mm:ss: 00:51:52
MTWTF : 00:00 00:00
SatSun: 00:00 00:00

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**YY/MM/DD**

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

**hh:mm:ss**

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

**MTWTF**

It defines an optional schedule for workdays (Monday thru Friday).

**SatSun**

It defines an optional schedule for weekends (Saturday and Sunday).

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

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**DETAILED DESCRIPTION OF VARIOUS SETTINGS**


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**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, 2014 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:** Unless a CR2032 clock backup battery is installed, 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**

This 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:** Unless a CR2032 clock backup battery is installed, 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 from power outages.

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.

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#### AUDIO LEVEL ADJUST

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To adjust the audio level, you can adjust the input level on the front panel BNC by using the next trimmer. (These trimmers are only related to the BNC inputs.)

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 the embedded STEREO FM encoder, and if using some audio processor with its own pre-emphasis setting, you must have it disabled.

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#### RF OUTPUT LEVEL ADJUST

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

**FASM1S** has been set at the **lowest - NO RF output - level** before shipping to prevent accidental misuse and/or damage that may arise otherwise. There is built-in protection from high VSWR that may appear at the output due to mismatch or in case someone turns it on without first having connected an appropriate load or antenna, however is best to avoid doing so.

First, you should attempt to tune the antenna (if your antenna is not a broadband type) with a low power (less than 50W) carrier, so that it has the least VSWR possible. Provided the antenna is correctly tuned for the transmission frequency and it appears as a 50 Ohm 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 can increase the output power up to any selected point until you read **FWD: 250W** (or even up to 300W maximum allowable level). The transmitter may be able to output even higher. Nevertheless, this extra output power doesn't add in reality anything to your signal strength or coverage, and it is preferred if you only use it at that maximum level in case you need to overdrive a following high power 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 50 Ohm load or to a tuned antenna capable of accepting power of at least 400W.***

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**Thank you for purchasing the FASM1S by ASPiSYS Ltd.**

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## 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	Nominal 5 - 250W @50Ω (300W max FASM1S-250)
Output Impedance	50 Ω
Harmonics (out-of-band)	Better than -60 dBc
RF modulation	FM (Mono or Stereo System, using built-in internal or optional external Stereo encoder)
Modulation	+/- 75KHz for 100% meter reading
Modulation type	F3 (EH) (180KF3EGN or 300KF8EHF)
Input Level	0.25V up to 2.5V p.p. (adjustable only for the front panel inputs)
Input Impedance	10KΩ unbalanced – 600 Ohm Balanced
Pre-emphasis	75 μS or 50 μS (factory preset according to country system)
Total Harmonic Distortion	<0.2% @ 1KHz
Operating Voltage	AC 230V or 115V (selectable) at 3.5A max (230VAC).



For technical support email [support@aspisys.com](mailto: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.