

A S M 1 0 0

(and compatibles)

**DDS FREQUENCY SYNTHESIZED
C-QUAM COMPATIBLE STEREO
AM TRANSMITTER
25W/100W carrier (100W/400W PEP)**

User's Guide

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

Note: Due to constant enhancements to the device's firmware and/or hardware, this guide is subject to revision, without prior notice.

ASM100 is a C-QUAM compatible stereo or mono AM transmitter. It achieves extremely high stability thanks to the latest technology DDS-based frequency generator, which provides better stability than that typical of PLL-based systems.

To operate you must connect it to your wall outlet AC 220-240V or 110-120V (factory preset) with an appropriate cable. There is an internal switch that is factory preset for your area. If not sure, please ask before plugging it in.

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, or to the rear XLR if you have a balanced audio feed.

O P E R A T I O N

ASM100 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 all possible enabled menu screens (*sequence shown farther below*) or selections within a single menu item.
- [↑]/[Up]** Acts as Up. It cycles through all 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 all 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 KHz and the indicator [ST] when operating in Stereo Mode. 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 for older versions (before 2015): 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.

Older models (2014 or before):

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.

Newer models (2015 or later):

Press [**▲**] to increase the RF output level, or to re-attempt OnAir after auto-OffAir due to excessive reflected power. When the maximum is reached, [H] will display on the LCD.

Press [**▼**] to decrease the RF output level. When the minimum is reached, [L] will display on the LCD. Pressing [**▼**] once again will turn the RF output off and [0] will display on the LCD.

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, 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 1KHz step from 530KHz to 1710KHz (*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. C-QUAM is compatible with mono receivers so operating at Stereo will not affect reception from typical mono receivers.

Sounding

Press [**●**] to toggle the sound option between On and Off. The sounding is used during a possible ALERT event due to excessive reflected power.

Loudness

Press [**●**] to toggle the loudness of the sound between On and Off. Off causes a soft clicking sound while On cause a significantly louder beeping sound.

Max FWD

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

Max REF

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

PowerMeterMode

Press [●] to toggle the FWD and REF metering mode between average (AVG) and peak-envelope-power (PEP).

BFO Trim

This is a very special setting that is normally only for use at the factory during initial calibration after manufacturing. **DO NOT CHANGE THIS SETTING** unless you have the necessary skills, the necessary precision measurement instruments, and a very good reason to feel a re-calibration will make a difference in the accuracy of the output frequency (as compared to the displayed frequency). In either case, make sure to make a note of the current factory value so you can restore the unit if you happen to change it. The new value is effective immediately after pressing the [↑] or [↓] buttons.

Note: If you inadvertently altered this setting and don't remember the original value, please turn the unit's power off and, after about 15 seconds, back on. Do NOT save any settings to internal memory (by exiting the Setting Screen) until power is cycled.

°C Offset

This setting defines an offset for temperature reading.

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

This field lets you define a password for accessing the Settings Screen. The password is 10 characters long and it's made up of either spaces or upper case alphabetic characters. There are 27¹⁰-1 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 built-in real-time clock is highly accurate as it is based on a TCXO module. *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 August 8, 2008 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: If an internal backup battery (type CR2032 or CR2025) isn't 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 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 ASM100 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, the trimmers next to the Audio RCA jacks can be used to adjust only the unbalanced audio level to your liking, for each channel (left and right) separately. Turn clockwise to increase the audio level. (In older versions, these same trimmers also affect the signal coming from the XLR inputs. In newer versions, this is no longer the case as the levels are fixed and they are not user adjustable.)

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 (i.e., fully clockwise for older models - 'L' indication for newer models equipped with a digital RF output level menu adjustment).

Start by connecting an audio source at its lowest possible 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 400 Hz tone from your audio source. (Avoid to apply 1 KHz tone for this measurement.) Next, start increasing the level of your audio source until the Modulation reading (Mod) shows 100%. Stop the 400 Hz audio generator from the source and connect your actual program audio with a level that will not exceed the level used with the 400 Hz tone when you're reading Modulation of 100%. Nevertheless, it's possible for the program audio to reach 125% momentarily during peaks but it's best to keep it as close as possible to 100% as your compressor allows.

As with all AM broadcasts, it's recommended that you use heavy compression on the audio program before it enters the transmitter. The transmitter has a built-in pre-emphasis for AM, 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).

IMPORTANT (for older units equipped with a rear-panel trimpot for RF output level): Turning the trimmer fully clockwise, you get the maximum RF power output, while counter-clockwise you get the minimum RF power output. It works like a gain control.

The trimmer pot is located in the rear panel, right below the XLR inputs.

Newer units have a digital RF output level adjust from the frequency menu screen.

Normally, the RF output level only has to be set once. If you're going to the frequency of operation, first reduce it to the minimum, change the frequency, and then re-adjust to the desired

power level as shown on the LCD. Under any circumstances, we do not recommend going above 25W while adjusting with a non-modulated signal.

ASM100 has been set at the minimum RF output level before shipping. This is done to protect it in case someone turns it on without first having connected an appropriate load or antenna.

Units with a digital RF output level adjustment (newer) will automatically switch to the minimum RF output level every time a new frequency is selected.

First, before changing the factory settings, 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 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, so that we can measure power of just the carrier signal. The 'PowerMeterMode' setting must be in AVG mode, which is the typical/preferred setting.

You should increase the output power up to point we read 25W (or 100W, depending on model). Absolute maximum allowable setting for correct operation is about 28W (or 130W), but above 25W (or 100W) it may cause a small distortion to the audio when modulation exceeds 100%.

ATTENTION: Even if the RF power trimmer allows increasing the power much higher, one should NEVER operate the transmitter at an output level (either modulated or unmodulated) above the respective model's maximum carrier for more than five (5) minutes. Doing so may seriously damage the final amplifier stages.

When making adjustments, please note the FWD reading on the device and wait for about 10 seconds for the reading to stabilize before making additional adjustments. Also, when you reach the desired level, please adjust slowly in small steps while verifying the output power (FWD) on the display which follows after a small delay.

Next, connect audio at low level and listen for any distortion. A distortion may be caused if the stereo audio signal applied to the inputs is of too high a level. If this should happen, you may need to re-adjust your audio source's modulation to a lower level.

VERY IMPORTANT NOTE, READ CAREFULLY

This device is a high power AM 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 even 800W.

Thank you for purchasing the ASM100 by ASPiSYS Ltd.

Technical Specifications

Subject to change without notice

RF Output Frequency	520 to 1710 KHz (Special versions may vary according to requirements)
Minimum Step	1 KHz
Frequency Accuracy	+/- 0.5 Hz max. (DDS)
RF Output Level (ASM100-25)	25 W carrier (adjustable from 5 W) @50 Ω
RF Output Level (ASM100-100)	100 W carrier (adjustable from 5 W) @50 Ω
Output Impedance	50 Ω
Harmonics (out-of-band)	-60 dBc
Audio Level Control	Adjustable for unbalanced input
RF modulation	AM (Mono, or C-QUAM Stereo System)
Input Level	0.25 V up to 2.5 V p.p. (adjustable unbalanced)
Input Impedance	10 K Ω unbalanced, 600 Ω balanced
Pre-emphasis	0 and 75 μ S or 50 μ S (preset according to your country system)
Total Harmonic Distortion	<0.4% @ 1 KHz
Operating Voltage	115 or 230 VAC (according to country)
Current Consumption (ASM100-25)	1.5A 1A max.
Current Consumption (ASM100-100)	6.0 A 3A max.



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