

# Using the AUX Port on the Conext™ XW+ to Connect to a Generator or the Grid

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Application Note

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## DANGER

### **RISK OF FIRE, ELECTRIC SHOCK, EXPLOSION, AND ARC FLASH**

This Application Note is in addition to, and incorporates by reference, the relevant product manuals for each product in the Conext series. Before reviewing this Application Note you must read the relevant product manuals. Unless specified, information on safety, specifications, installation, and operation is as shown in the primary documentation received with the product. Ensure you are familiar with that information before proceeding.

**Failure to follow these instructions will result in death or serious injury.**

## Objective

The goal of this Application Note is to provide instructions on how to use the internal AUX Port on the bottom panel of Conext XW+ Inverters/Chargers to manage the status and connection of any external Generator or Grid and without using the Automatic Generator Starter (AGS) module.

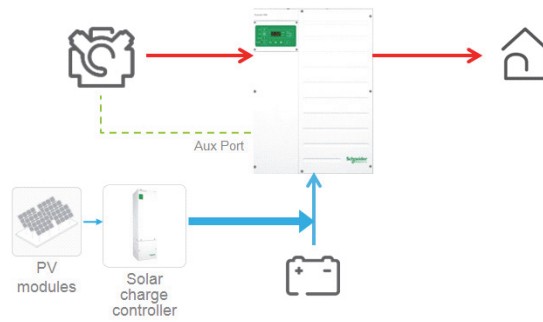
## Use Case Scenario

PV cost has significantly been going down over the last years due to the continued reduction in manufacturing costs and massive penetration of the technology into more markets. As a result, PV technology has become accessible for many homeowners and small businesses who are seeking ways to reduce their grid dependency and their electricity bill.

Considering that cost reduction on all components of the system starting from PV panels to battery packs will likely continue in the near future and during this same time grid electricity costs keep increasing significantly, it makes sense to think about producing and consuming your own electricity using a battery-based power system.

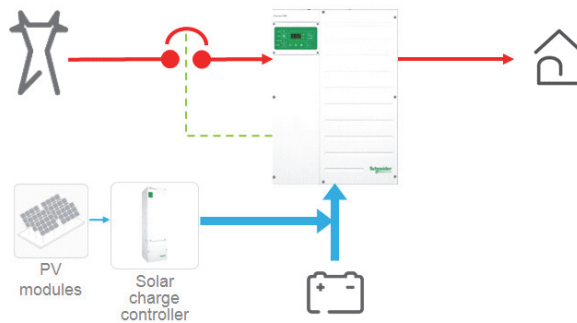
These battery-based power systems can be designed to achieve the goal of producing your own electricity. There are different scenarios in which this can happen.

- Off-grid scenario - an external generator is required in addition to solar, for a continuous energy supply.



**Figure 1** Off-Grid Scenario

- Grid-tie backup scenario - solar production is the primary power source with grid supply provided as backup.



**Figure 2** Grid-Tie Backup Scenario

In both scenarios, homeowners and installers look for system simplicity and easy commissioning. The ultimate goal is reduce the Balance of System and accessories that are needed for both scenarios.

The Conext XW+ introduces a significant new option of utilizing the auxiliary output port (AUX Port) control to perform other functionality.

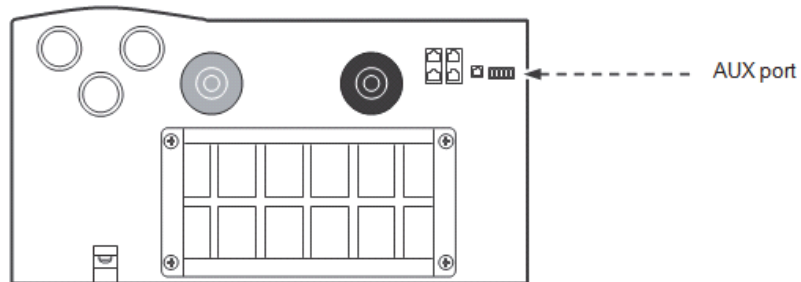
## AUX Port on Conext XW+ Inverters

Each Conext XW+ has one programmable 12 V, 0.25 A AUX Port that is capable of powering a small fan or operating an external relay to perform other functions. In the latter case, the AUX Port is used to control an external relay which is really just a signal to the generator or grid to engage according to the Conext XW+'s battery's state-of-charge (SOC).

That AUX port can be triggered (meaning it can send out a signal to the external relay) in response to one or more of the following conditions.

- low battery voltage
- low battery temperature
- charge bulk exit
- heatsink temperature
- SOC
- high battery voltage
- high battery temperature
- charge absorption exit
- TOD (time-of-day)

Both of the use case scenarios on page 1 have the following conditions that would trigger the AUX Port: low battery voltage and SOC.



**Figure 3** Location of AUX Port on the Conext XW+

The AUX Port output can also be triggered manually using a Conext System Control Panel (SCP) or Conext ComBox.

### AUX Port Terminal Pins

DC voltage is available in two pins: JU-1 and JU-3. The power available at each of these terminal pins is 12 VDC with a maximum current of 250 mA (about 3 watts of power).

The AUX+12V voltage supply at JU-1 can be programmed for either ON or OFF using the SCP. The default status of AUX+12 V is OFF.

**Table 1** AUX Port Terminal Pin Assignments

Pin	Reference	Name	Function
JU-1	AUX+12V	Switched +12 V User Voltage Supply	+12 VDC Voltage source: 250 mA maximum
JU-2	AUX-RPO	Remote Power Off	Remote Power Off Logic Level: Active Low  Activating this signal shuts down system operation.
JU-3	AUX-COM	Common Ground Reference	Return Common Ground  Reference for 12 V, Remote Power Off signals
JU-4	EXT_TS_OUT	External Transfer switch: Output signal	Open collector type drive circuit  30V/0.5A max
JU-5	EXT_TS_IN	External Transfer switch: Input signal	External Transfer switch: Low  signal range:(0-5V) High signal range:10-28V with the consumption of 8mA@12V and 10mA@24V.

## Configuring AUX Port on Conext XW+ Inverter

Use the SCP or Conext ComBox to configure the AUX Port on the Conext XW+ Inverter following a very simple procedure below.

Depending on the objective, set up the mode of operation, active level, and trigger accordingly.

Mode of operation	Sets the state of the AUX Port output. <b>ManualOn</b> or <b>ManualOff</b> allows manual control of the AUX Port output. When set to <b>Automatic</b> , a trigger source can then be selected.
Active Level	Sets the mode (polarity) of the AUX Port output. When triggered, the output can be active high (12 V output turns on) or active low (output is high until the trigger turns it off).
Triggers	<p>Trigger source (<b>Trig Src</b>) sets the desired condition to activate the AUX Port output. The trigger source options in the use case scenarios are <b>LowBattV</b> and <b>SOC</b>.</p> <p><b>Trigger Level</b> sets the voltage or temperature level (depending on the selected trigger source) at which the AUX Port output is activated. If the selected trigger source is the Battery Voltage, the range also varies according to the nominal battery voltage of your system.</p> <p><b>Trigger Delay</b> sets a delay period between when the trigger occurs and when the AUX Port output is activated.</p>

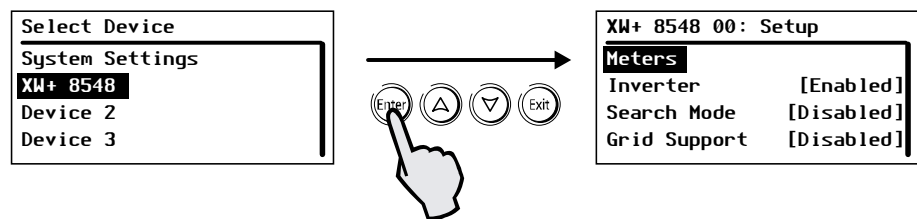
### Configuring AUX Port for LowBattV

Low battery voltage (**LowBattV**) activates the AUX Port output when the battery voltage falls below **LowBattV** after the **Trigger Delay** time. The AUX Port output turns off when the battery voltage rises above the clear setting after the **Clear Delay** time.

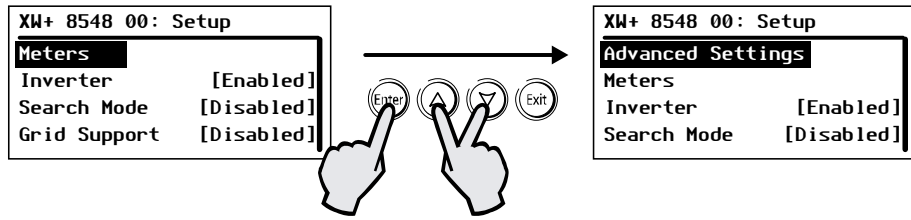
To configure the low battery voltage mode of operation of the AUX Port, access the **Advanced Settings** menu on the Conext XW+ via the SCP.

**To configure using the advanced settings:**

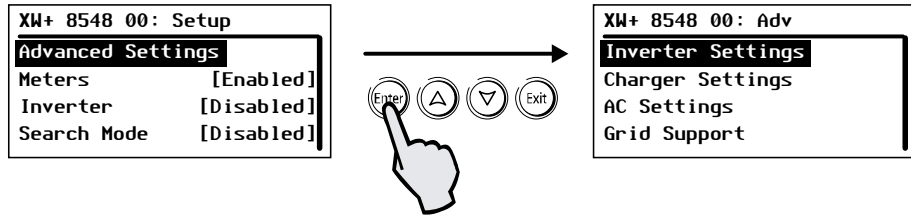
1. On the Select Device menu, select the Conext XW+ device and press Enter to bring up the Device Setup menu.



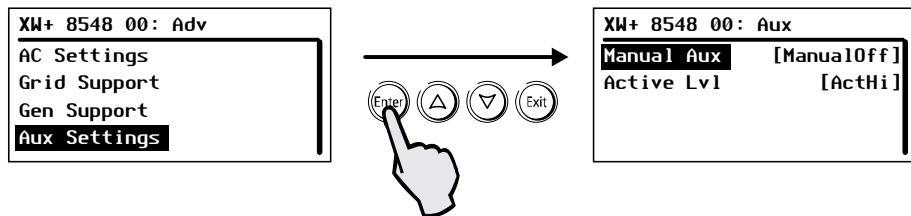
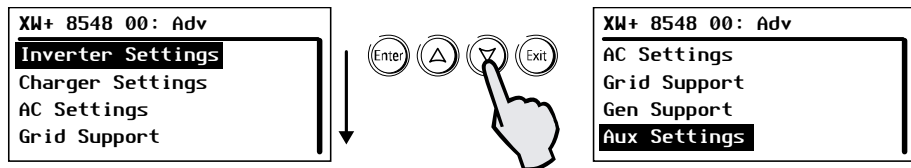
2. Press Enter + up arrow + down arrow buttons at the same time and quickly release to reveal Advanced Settings on the Device Setup menu.



3. Press Enter to bring up the Advanced Settings menu.



4. Press the down arrow button until you select Aux Settings. Once Aux Settings is selected, press Enter.



Trigger and Clear settings appear only when Manual Aux is set to Automatic.

<b>XW+ 8548 00: Aux</b>	
<b>Manual Aux</b>	[Automatic]
<b>Active Lvl</b>	[ActHi]
<b>Trig Src</b>	[LowBattV]
<b>Trigger Level</b>	[44V]
<b>Trigger Delay</b>	[10sec]
<b>Clear Src</b>	[LowBattV]
<b>Clear Level</b>	[48V]
<b>Clear Delay</b>	[10sec]

hidden from SCP display (see Note)

**NOTE:** The SCP displays only four lines of each configuration menu at one time. To view additional settings, press the down arrow button.

**Use the following settings:**

Manual Aux	Automatic
Active Lvl	Act Hi
Trig Scr	LowBattV
Trigger Level	44V (this setting depends on battery specifications and desired level of discharge)
Trigger delay	10 sec
Clear Level	48V
Clear Delay	10 sec

## Configuring AUX Port for SoC

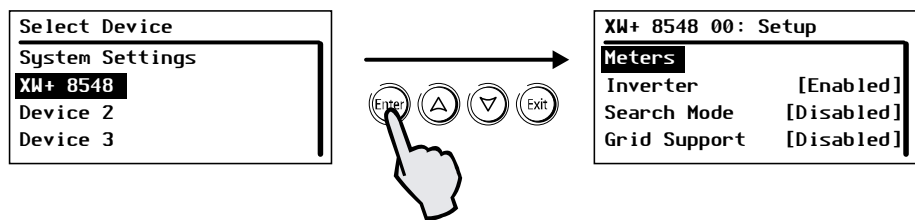
This feature of the Conext XW+ AUX Port works in conjunction with the Conext Battery Monitor. The AUX Port output is usually triggered when the SOC falls outside of the range of 25-90% of total battery charge. When triggered, the AUX Port output can be active high (12 VDC output is turned ON) or active low (the output is active high until the trigger turns it off).

The Conext Battery Monitor is rated for 24 volt and 48 volt batteries and designed for use in off-grid power systems. Its cable is one meter long and it can be installed on a wall or other panel. It can also be mounted on a DIN rail in stationary renewable energy applications. It features a local display to selectively show the voltage, current, consumed amp-hours, remaining capacity and remaining hours.

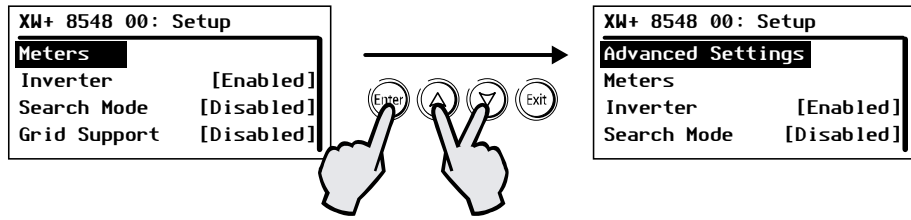
To configure the SOC mode of operation of the AUX Port, access the **Advanced Settings** menu on the Conext XW+ via the SCP.

**To configure using the advanced settings:**

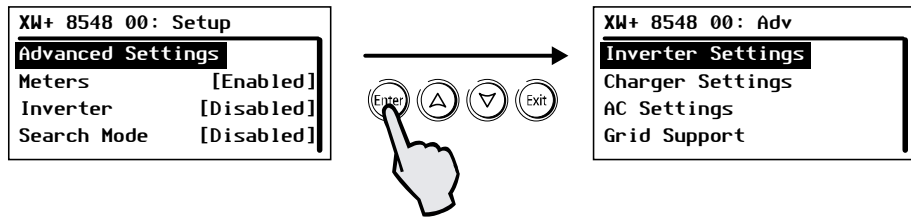
1. On the Select Device menu, select the Conext XW+ device and press Enter to bring up the Device Setup menu.



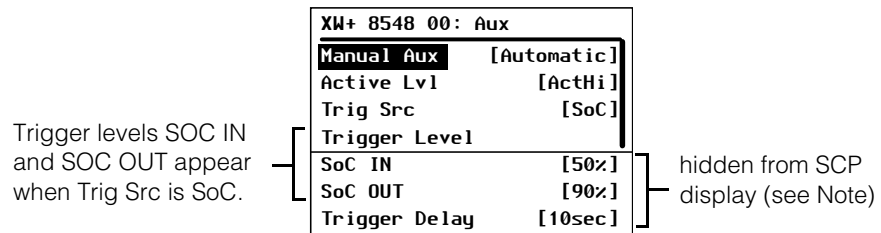
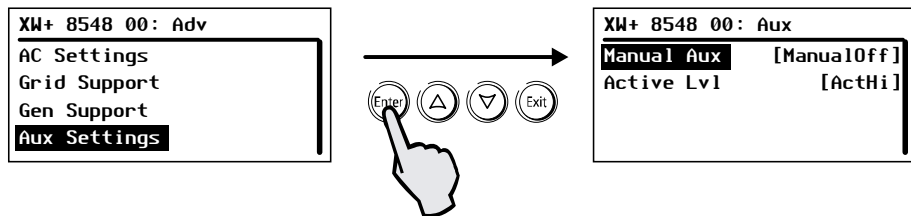
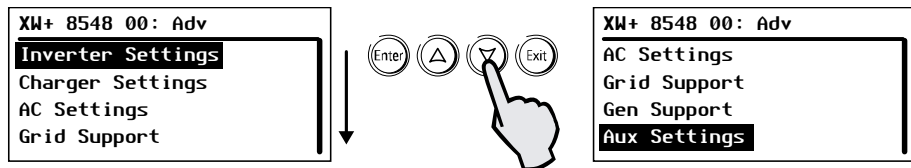
2. Press Enter + up arrow + down arrow buttons at the same time and quickly release to reveal Advanced Settings on the Device Setup menu.



3. Press Enter to bring up the Advanced Settings menu.



4. Press the down arrow button until you select Aux Settings. Once Aux Settings is selected, press Enter.



**NOTE:** The SCP displays only four lines of each configuration menu at one time. To view additional settings, press the down arrow button.



**Use the following settings:**

<b>Manual Aux</b>	<b>Automatic</b>
Active Lvl	Act Hi
Trig Scr	SoC
Trigger Level	
SoC IN	50%
SoC OUT	90%
Trigger delay	10 sec