PPS Distribution Panel Gen 2

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Document revision history
RTD012 PPS Distribution Panel Gen 2 User Manual

Edition	Date	Comments
0.9	16.09.2024	Initial release
1.0	20.03.2025	Updated with new jumper settings

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Introduction 1

The RTS PPS Distribution Panel Gen 2 is the key solution for distribution of GPS timing in a survey equipment installation.
The unit distributes PPS and RS232 timing telegram to sixteen combined PPS & RS232 outputs, plus eight PPS BNC outputs.

The unit features the following functionality

- Input amplifier for PPS and RS232 telegram
- Pulse width generator
- LED indicators
- Jumper setting for alternative configurations

Physical characteristics

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Figure 1: PPS Distribution Panel Gen 2.

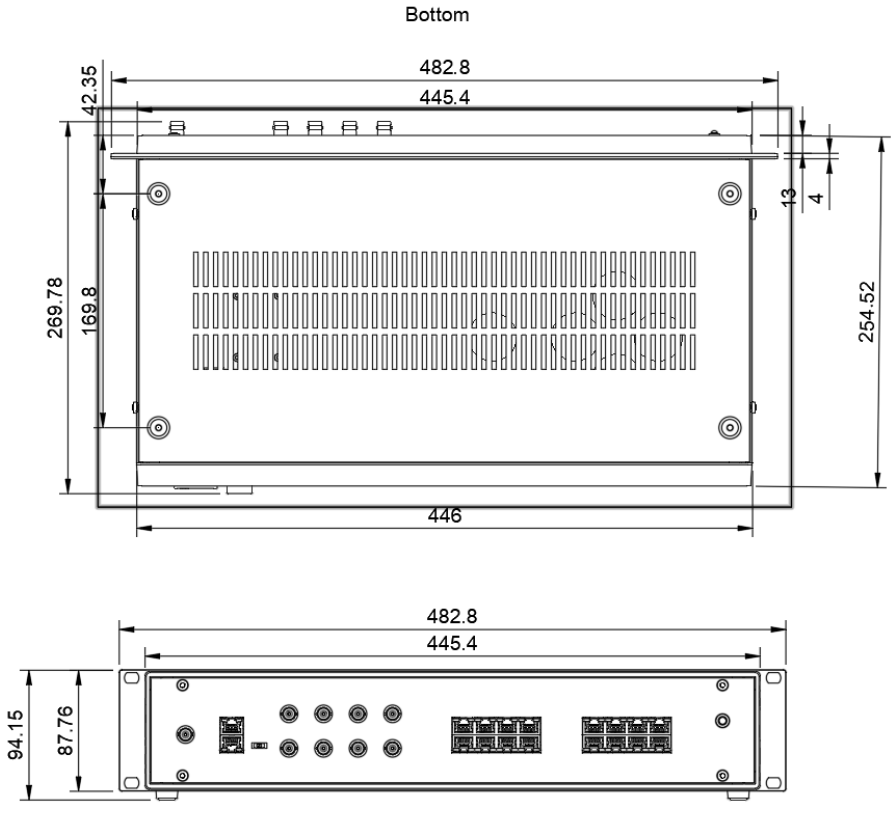

Figure 2: Dimensions, bottom and front view.

Parameter	Value
Weight	5.1 kg
Primary mechanical material	Coated aluminium
Minimum ambient operating temperature	0 ºC
Maximum ambient operating temperature	40 ºC

Table 1: Physical characteristics.

Electrical characteristics 3

3.1 Input power

Use the supplied AC mains cord to power the system.
The system can be powered on/off using the switch located on the back of the unit.

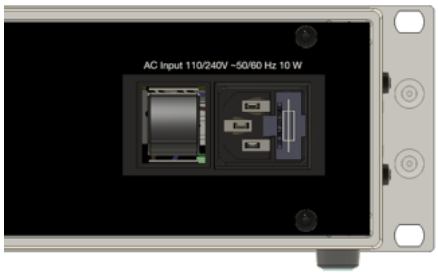

Figure 3: AC Input connector.

Parameter	Minimum	Maximum
Input voltage	90 Vac	305 Vac
Input frequency	47 Hz	440 Hz
Input power		10 W

Table 2: Input characteristics.

The input connector holds a replaceable 20 mm glass fuse.
Please contact RTS upon replacing the fuse.

Parameter	RTS Part number	Sourcing
Input fuse	A001567	Littlefuse 0217.250TPX

Table 3: Input fuse.

3.2 Overview of system settings

The input signal can be routed from the PPS INPUT connector
or the RS232 INPUT #1 connector.
The unit is divided into two equal eight channel RJ45 output circuits for the outputs:
RS232 + PPS OUTPUT #1 and RS232 + PPS OUTPUT #2.
The default configuration is listed below. All settings listed can be changed.
Please refer to chapter 4 for further instructions.

Default settings

1. PPS INPUT (BNC connector) is routed to all PPS Outputs
2. PPS Pulse length is set to 1:1
3. RS232 INPUT #1 routed to RS232 OUTPUT #1
4. RS232 INPUT #2 routed to RS232 OUTPUT #2
5. All inputs triggers on positive edge
6. No signals are inverted

The inputs are galvanically isolated from the outputs. All inputs are on one common ground and all outputs are on a common ground different from the input ground.

3.2.2 Pulse length selector

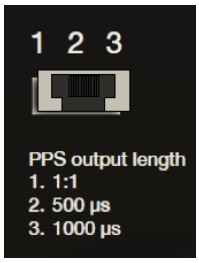

Figure 4: Pulse length selector.

NOTE! Please power off the unit before changing the pulse length.
The length of the output pulse can be changed from the front panel slide switch.
This setting applies to all pulse outputs.

Selection	Title	Description
1	1:1	The output pulse is identical to the input pulse
2	500 µs	Each input pulse edge will trigger a 500 µs output pulse
3	1000 µs	Each input pulse edge will trigger a 1000 µs output pulse

Table 4: Pulse length selector.

3.3 Input and output signal characteristics

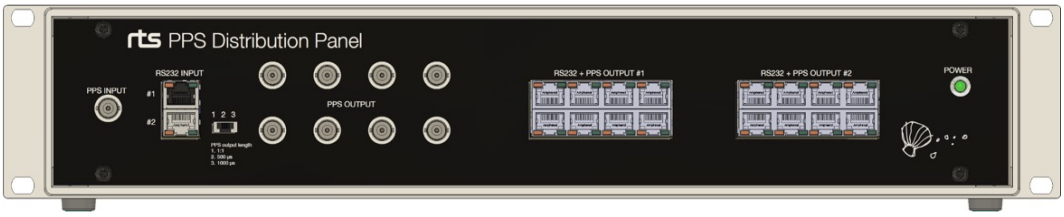

Figure 5: PPS Distribution Panel front view.

3.3.1 PPS signal characteristics

Parameter	Minimum	Typical	Maximum
Input voltage		5 V	
Input high level threshold	2.7 V		
Input low level threshold			0.8 V
Input minimum pulse length	500 ns		
Output driver voltage level		5 V	5.5 V
Output current			20 mA
Output pulse length	500 ns		

Table 5: PPS signal characteristics.

3.3.2 RS232 signal characteristics

Parameter	Minimum	Typical	Maximum
Input voltage		5 V	
Input low level threshold			0.8 V
Input high level threshold	2.7 V		
Output driver voltage level		5 V	5.5 V
Output current			15 mA
Maximum data rate			1.5 Mbps

Table 6: RS232 signal characteristics.

3.4 Input connectors

There are three input connectors where one is BNC and two are RJ45s.
All three connectors are referenced to the same signal ground. It should be noted however that this ground is galvanically isolated from the output signal ground.

The RJ45 connector has two LEDs.
The behavior of the LED's is described in the table below.

Indicator	Behavior
Green	Valid input signal received PPS indicator flash
Yellow	Optional PPS indicator from #1 PPS indicator flash

Table 7: LED behavior.

3.4.1 PPS INPUT (BNC)

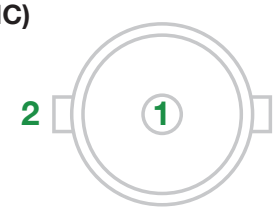

Figure 6: BNC connector.

Pin	Description
1	PPS In
2	Input signal ground

Table 8: Wiring for BNC Input connector.

3.4.2 RS232 INPUT (RJ45)

Figure 7: RJ45 Input connector.

Pin	Description
1	PPS In (optional on #1)
2	
3	
4	Input signal ground
5	RS232 RxD
6	
7	
8	

Table 9: Wiring for BNC Input connector.

3.5 Output connectors

There are three different output connectors, the PPS OUTPUT BNC connectors, RS232 + PPS OUTPUT #1 and RS232 + PPS OUTPUT #2.
Routing of the signals from input to output can be configured according to chapter 4.

3.5.1 PPS OUTPUT

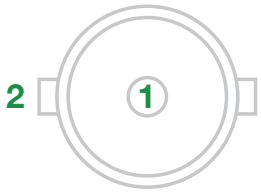

Figure 8: BNC connector.

Pin	Description
1	PPS Out
2	Output signal ground

Table 10: Wiring for BNC output connector.

3.5.2 RS232 + PPS OUTPUT #1 and RS232 + PPS OUTPUT #2

Figure 9: RJ45 Output connector

Pin	Description
1	PPS Out
2	
3	
4	Output signal ground
5	RS232 TxD
6	
7	
8	

Table 11: Output connector LEDs.

The output RJ45 connectors each have two LED indicators. Behavior of the LEDs are described below.

Indicator	Behavior
Green	RS232 data indicator
Yellow	PPS indicator

Table 12: Output connector LEDs.

Alternative configurations

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The following settings can be changed from the internal jumper settings of the unit.

- Use BNC or RJ45 #1 as source for the PPS signal
- Trig on positive or negative edge
- Invert pulse signal
- RS232 routing setup

Additionally, the output pulse length can be changed (see chapter 3.2.1).
Remove the top lid of the unit to access the jumper settings. Use a torx 10 key to remove the 4 screws holding the lid in place. After the lid has been removed the jumpers can be found next to the power input on the main PCB.

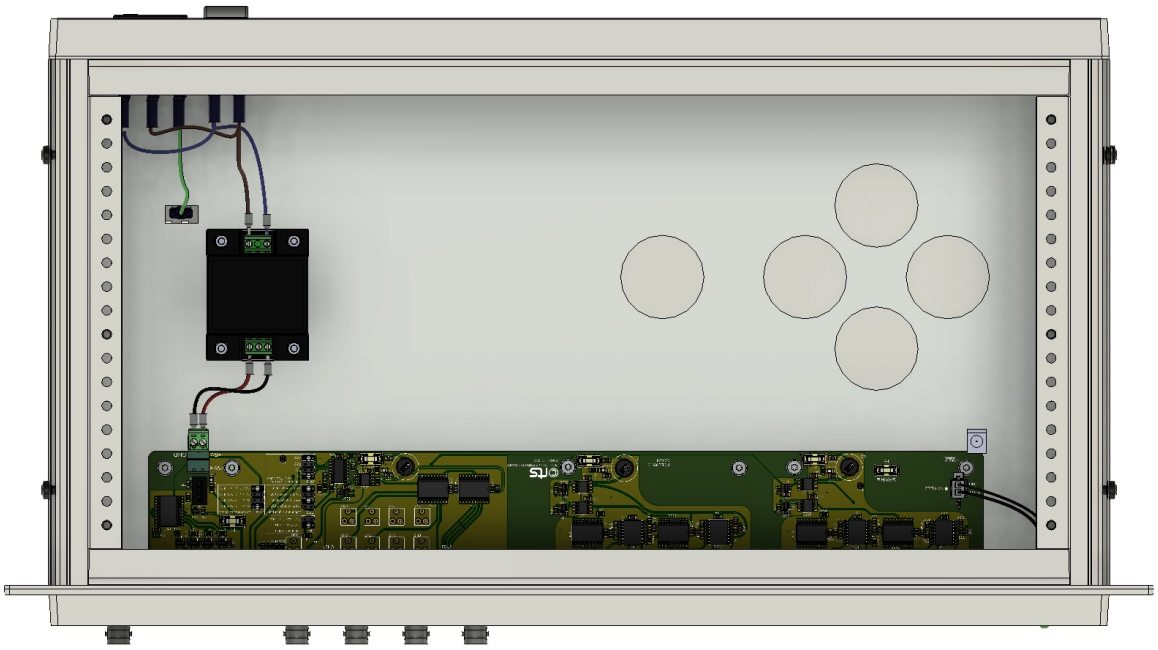

Figure 10: PPS Distribution Panel top view without lid.

4.1.1 Default configuration

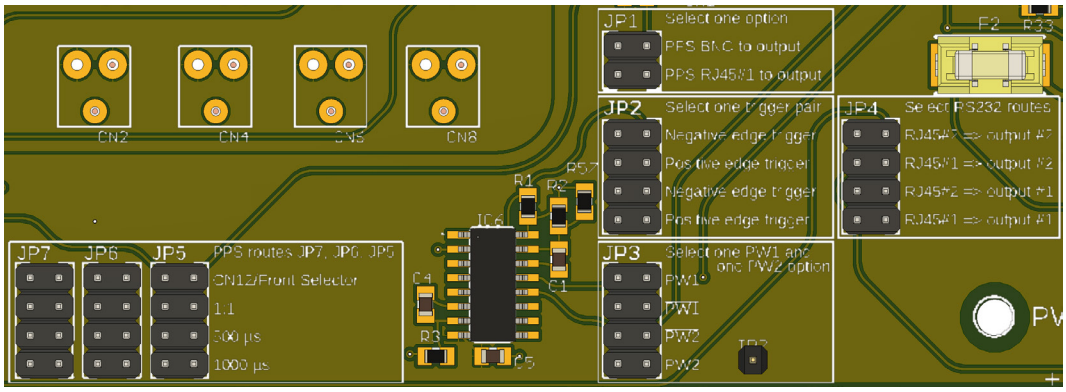

Figure 11: Default configuration.

Jumper	Default setting
JP1	PPS BNC to output
JP2	2 x Positive edge trigger
JP3	PW1 and PW2
JP4	RJ45#2 => output #2 RJ45#1 => output #1

Table 13: Default jumper settings.

4.1.2 JP1 PPS source selector

The PPS signal can be triggered from the BNC input connector (chapter 3.4.1) or the RJ45 #1 connector (chapter 3.4.2). Select one of the two options from JP1.

PPS BNC to output
PPS RJ45#1 to output

4.1.3 JP2 Input edge trigger selector

The input can trigger on positive edge (default) or negative edge. Please select one of the two options below. Note that both selectors have to be moved to select the other option. Do not select any other option than the two options listed below.

Option 1: Positive edge trigger (default setting).

Table 14: Positive edge trigger jumper setting.

		Negative edge trigger
■	■	Positive edge trigger
		Negative edge trigger
■	■	Positive edge trigger

Option 2: Negative edge trigger.
This option is only active when the PPS output length is set to 500 µs or 1000 µs.

Table 15: Negative edge trigger jumper setting.

■	■	Negative edge trigger
		Positive edge trigger
■	■	Negative edge trigger
		Positive edge trigger

4.1.4 JP3 Pulse polarity selector

These jumpers sets output polarity for the 500 us and 1000 us pulses
PW2 - Output has the same polarity as the input for 500 us pulse
PW2 - Output is inverted for 500 us pulse
PW1 - Output has the same polarity as the input for 1000 us pulse
PW1 - Output is inverted for 1000 us pulse

4.1.5 JP4 RS232 routing selector

There are two separate RS232 input connectors RS232 INPUT #1 and #2.
See chapter 3.4.2 for more info.
JP4 select which outputs the two input signals are routed to.
Valid settings are listed next. Do not set any other configurations.

Option 1:
RS232 INPUT #1 is routed to RS232 OUTPUT #1
and RS232 INPUT #2 is routed to RS232 OUTPUT #2.

JP4 Select RS232 routes

■	■	*RJ45#2 => output #2*
		RJ45#1 => output #2
		RJ45#2 => output #1
■	■	*RJ45#1 => output #1*

Table 16.

Option 2:
RS232 INPUT #1 is routed to both RS232 OUTPUT #1
and RS232 OUTPUT #2.

JP4 Select RS232 routes

		RJ45#2 => output #2
■	■	*RJ45#1 => output #2*
		RJ45#2 => output #1
■	■	*RJ45#1 => output #1*

Table 17.

Option 3:
RS232 INPUT #2 is routed to both RS232 OUTPUT #1
and RS232 OUTPUT #2.

JP4 Select RS232 routes

■	■	*RJ45#2 => output #2*
		RJ45#1 => output #2
■	■	*RJ45#2 => output #1*
		RJ45#1 => output #1

Table 18.

Option 4:
RS232 INPUT #2 is routed to RS232 OUTPUT #1
and RS232 INPUT #1 is routed to RS232 OUTPUT #2.

JP4 Select RS232 routes

		RJ45#2 => output #2
■	■	*RJ45#1 => output #2*
■	■	*RJ45#2 => output #1*
		RJ45#1 => output #1

Table 19.

4.1.6 JP5, JP6 and JP7

These jumpers will override the front slide switch setting for the pps outputs. The jumpers can be used to individually set pulse lengts for BNC, PPS Output #1 and PPS Output #2.

JP 5 - BNC Output pulse length

JP 6 - PPS Output #1 pulse length

JP 7 - PPS Output #2 pulse length

General block schematics

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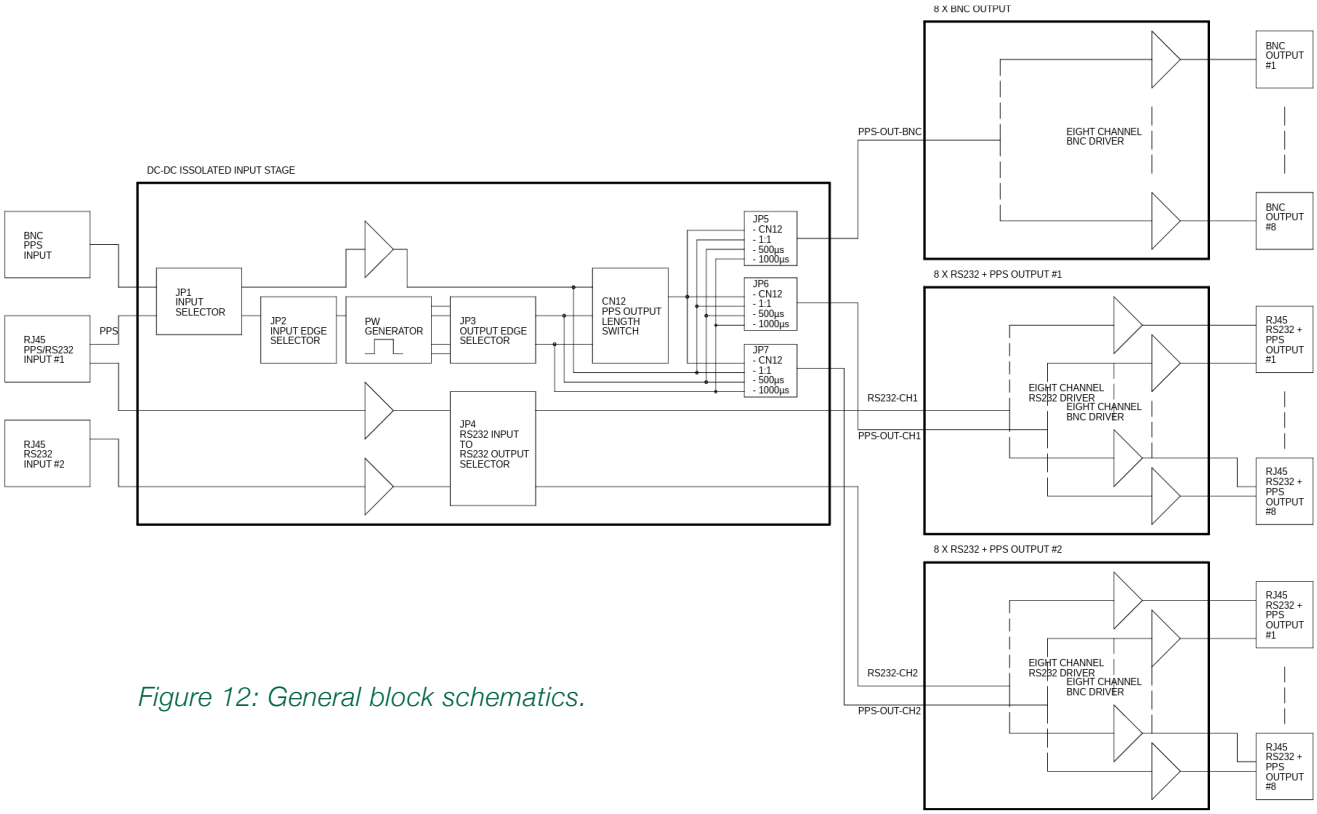

Figure 12: General block schematics.

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