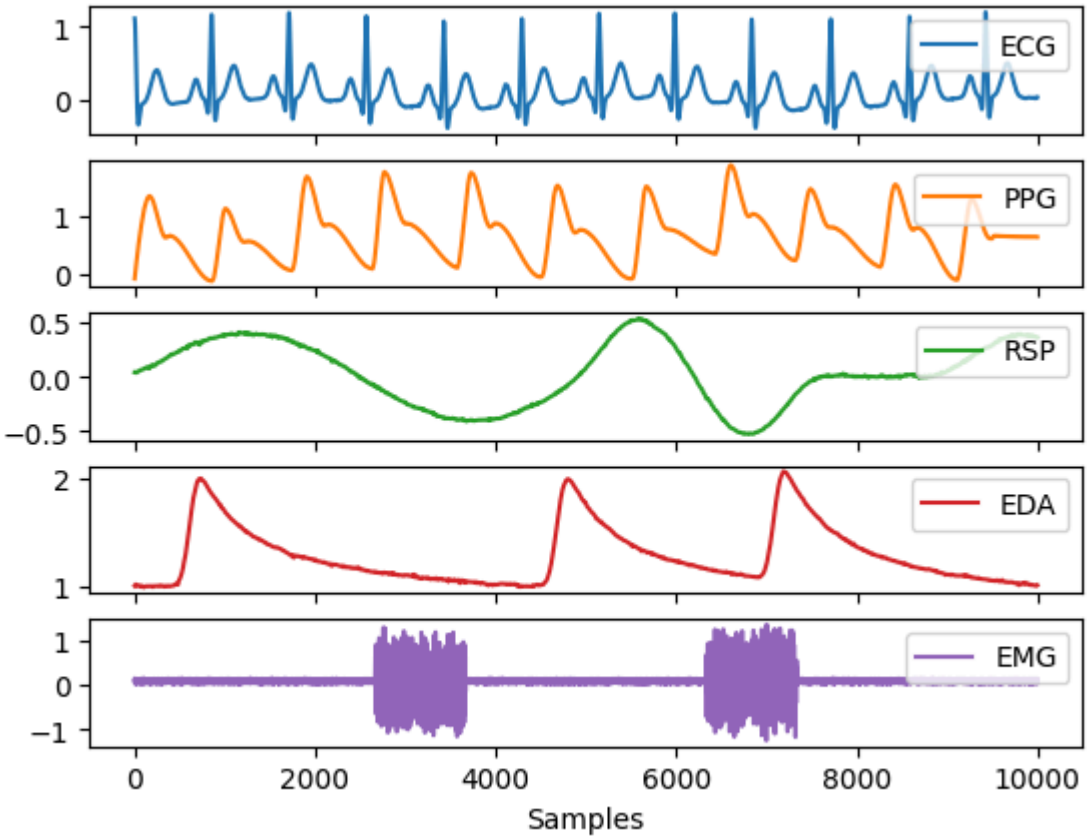
In [21]:
```
#Biomedical Signal Processing
```

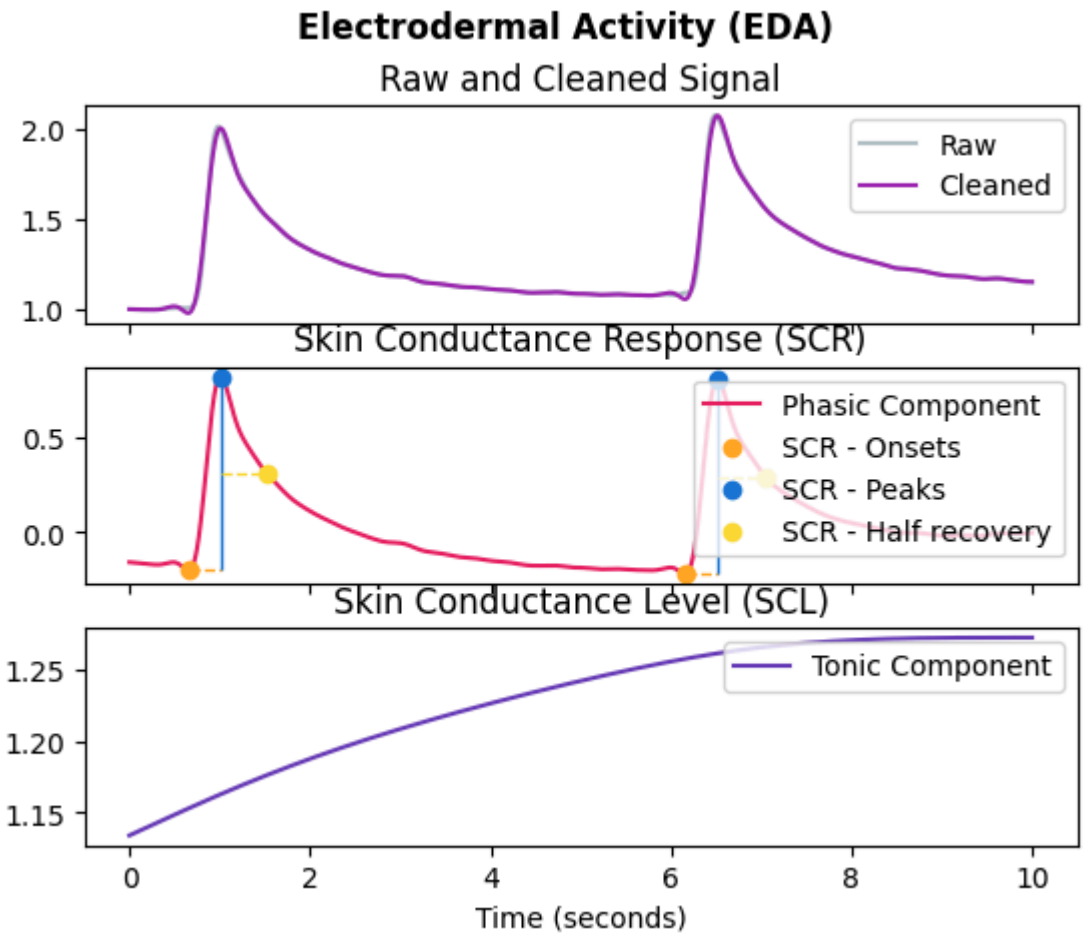
In [7]:
```
#import needed library
import numpy as np
import pandas as pd
import neurokit2 as nk
```

In [8]:
```
# Generate synthetic signals
ecg = nk.ecg_simulate(duration=10, heart_rate=70)
ppg = nk.ppg_simulate(duration=10, heart_rate=70)
rsp = nk.rsp_simulate(duration=10, respiratory_rate=15)
eda = nk.eda_simulate(duration=10, scr_number=3)
emg = nk.emg_simulate(duration=10, burst_number=2)
```

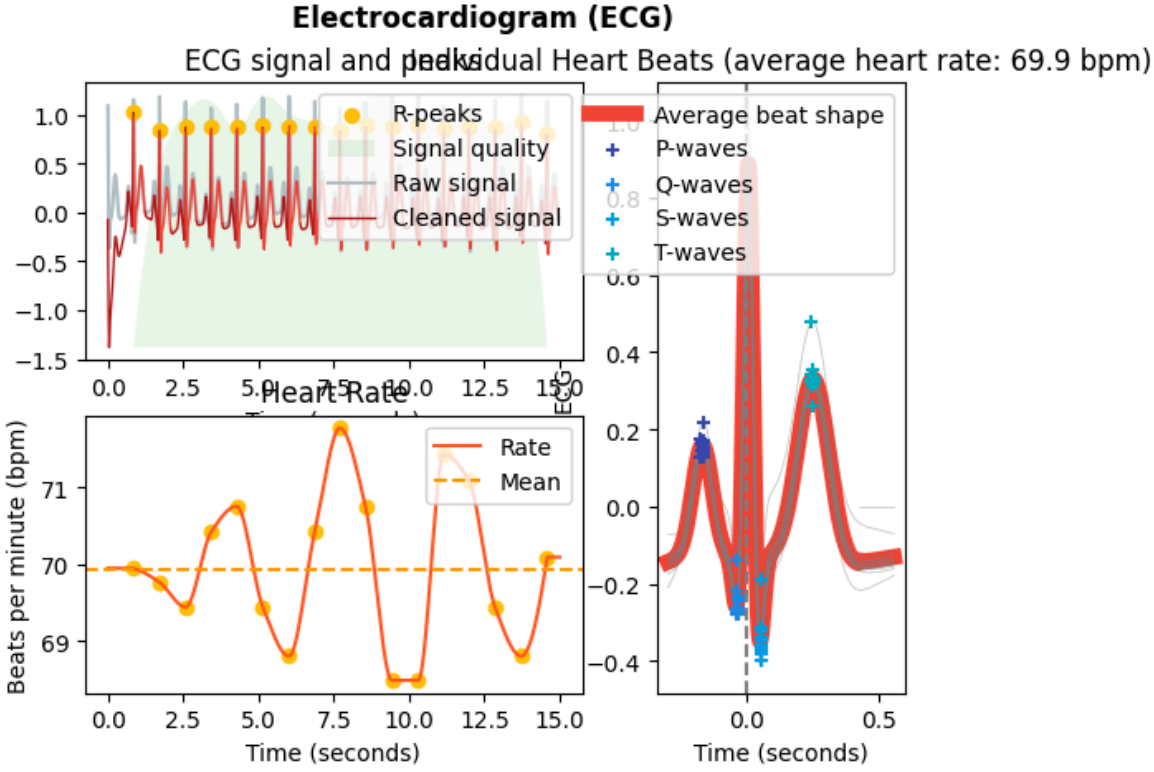
In [9]:
```
# Visualise biosignals
data = pd.DataFrame({"ECG": ecg,
                     "PPG": ppg,
                     "RSP": rsp,
                     "EDA": eda,
                     "EMG": emg})
nk.signal_plot(data, subplots=True)
```



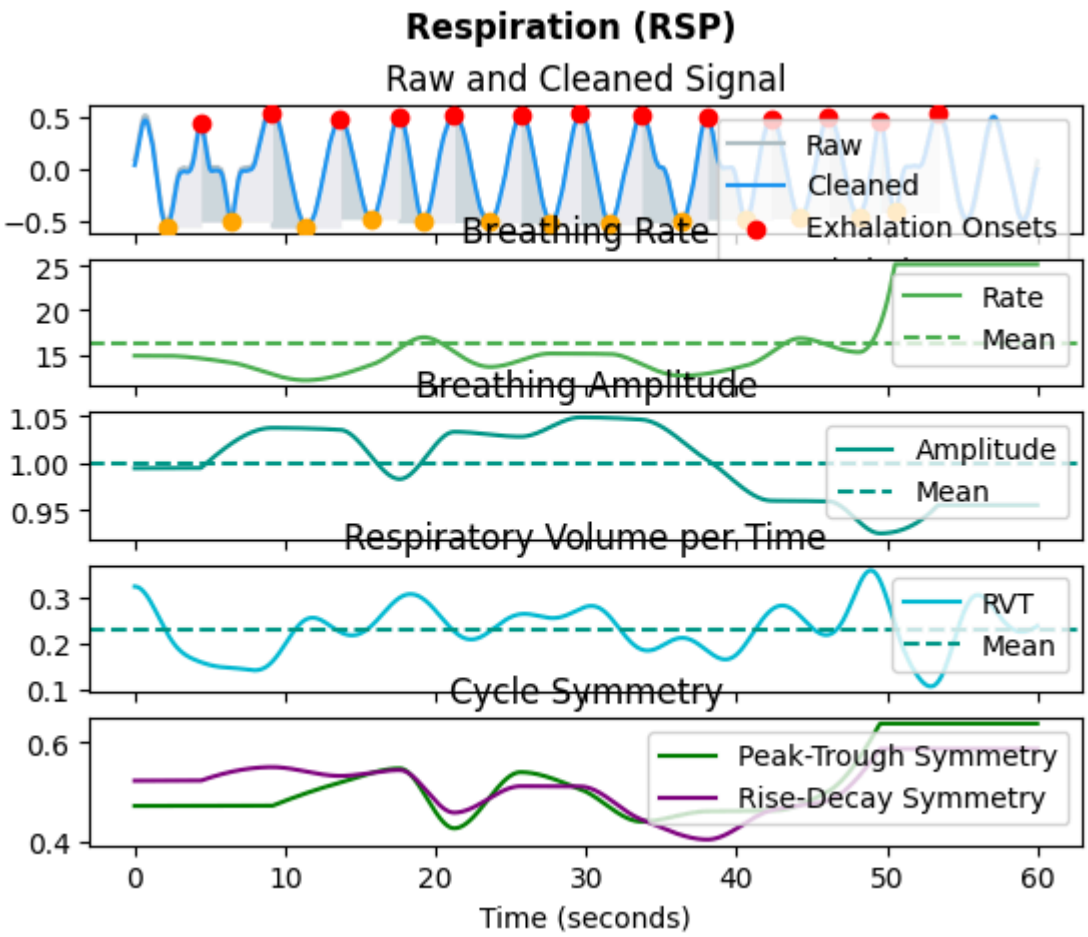
In [12]:
```
#Electrodermal Activity (EDA/GSR)
# Generate 10 seconds of EDA signal (recorded at 250 samples / second) with 2 SC
eda = nk.eda_simulate(duration=10, sampling_rate=250, scr_number=2, drift=0.01)

# Process it
signals, info = nk.eda_process(eda, sampling_rate=250)

# Visualise the processing
nk.eda_plot(signals, info)
```



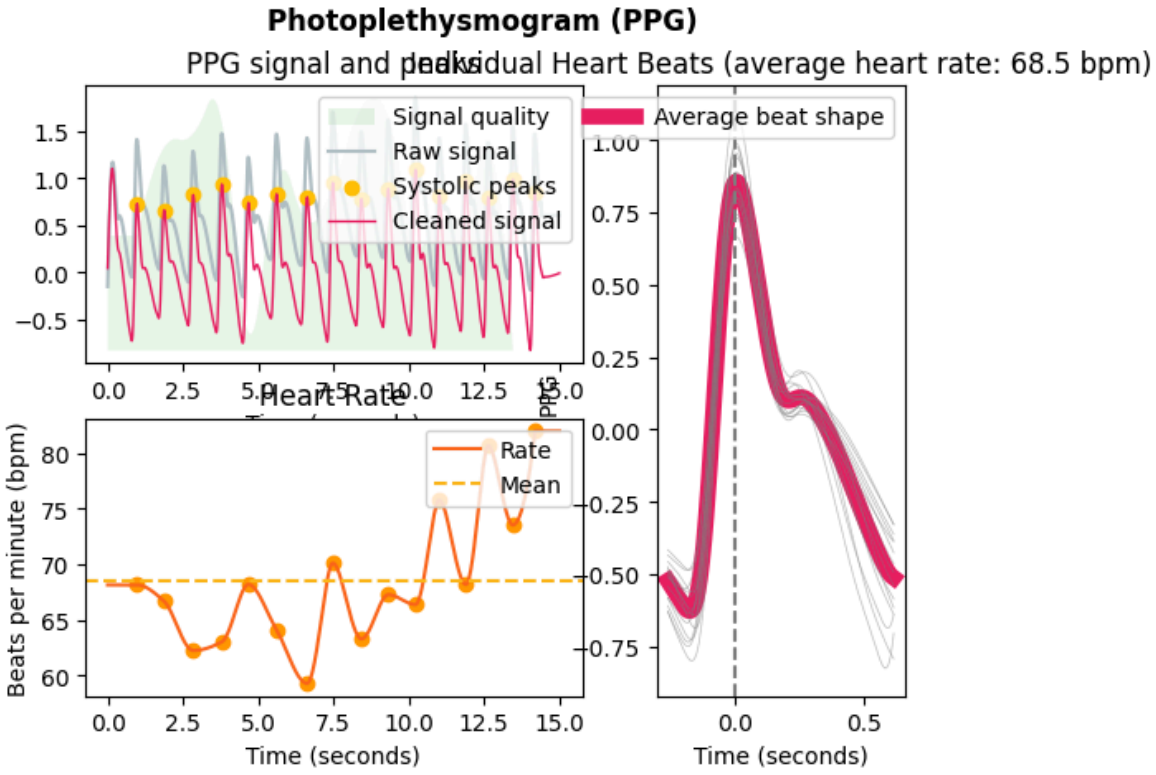
In [13]:
```
#Cardiac activity (ECG)
# Generate 15 seconds of ECG signal (recorded at 250 samples/second)
ecg = nk.ecg_simulate(duration=15, sampling_rate=250, heart_rate=70)

# Process it
signals, info = nk.ecg_process(ecg, sampling_rate=250)

# Visualise the processing
nk.ecg_plot(signals, info)
```



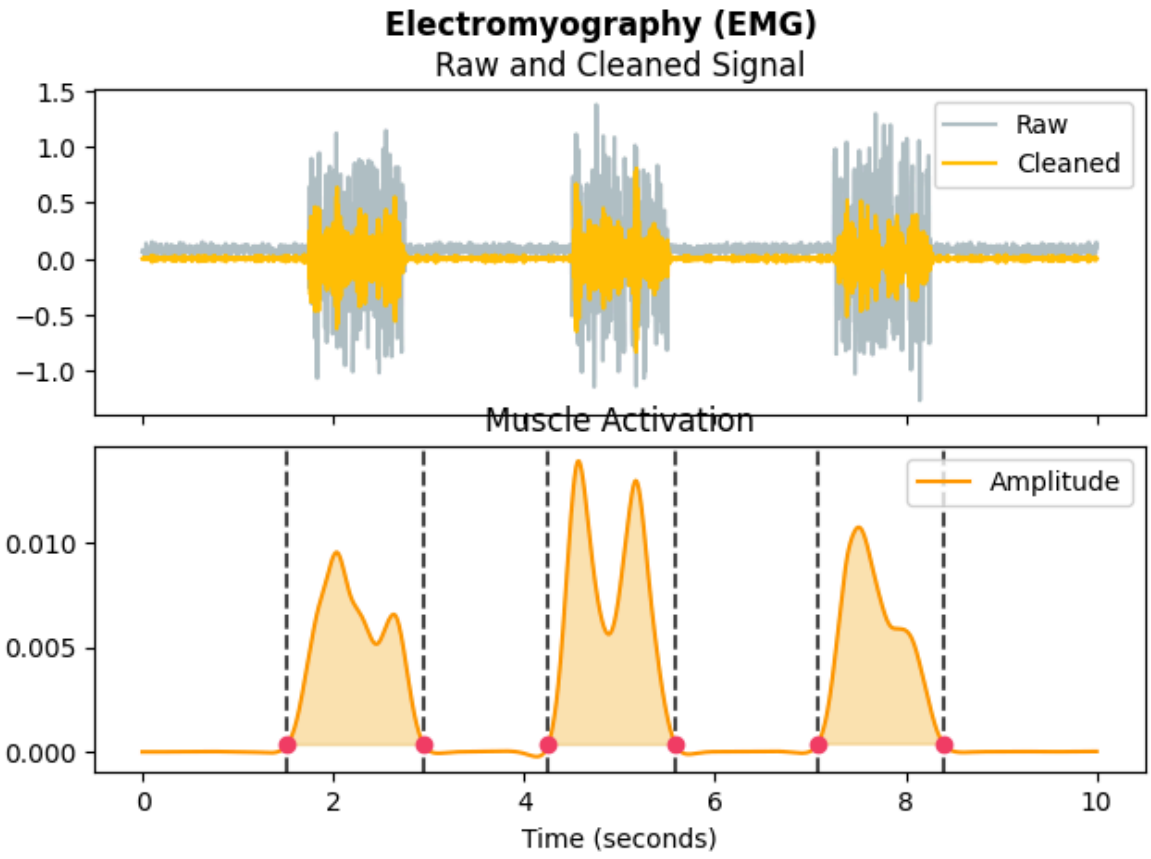
In [14]:
```
#Respiration (RSP)
# Generate one minute of respiratory (RSP) signal (recorded at 250 samples / sec
rsp = nk.rsp_simulate(duration=60, sampling_rate=250, respiratory_rate=15)

# Process it
signals, info = nk.rsp_process(rsp, sampling_rate=250)

# Visualise the processing
nk.rsp_plot(signals, info)
```



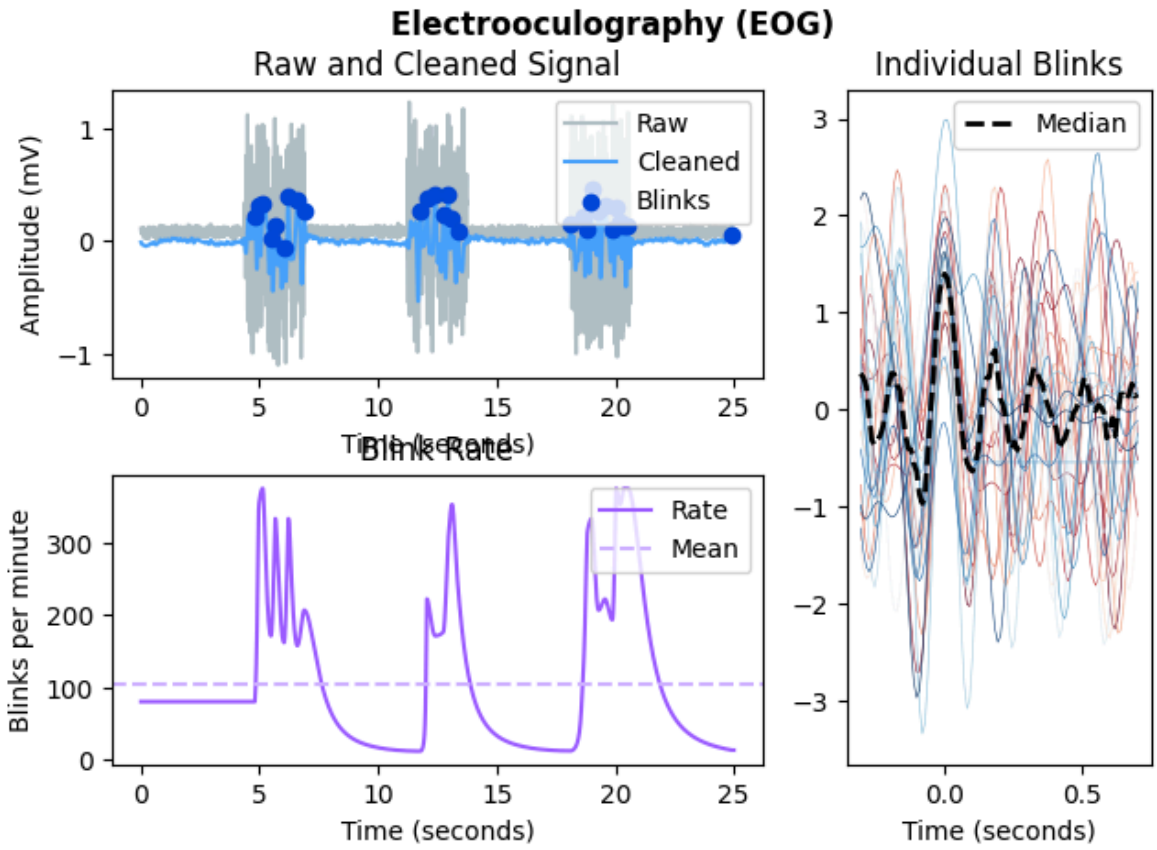
In [15]:
```
#Photoplethysmography (PPG/BVP)
# Generate 15 seconds of PPG signal (recorded at 250 samples/second)
ppg = nk.ppg_simulate(duration=15, sampling_rate=250, heart_rate=70)

# Process it
signals, info = nk.ppg_process(ppg, sampling_rate=250)

# Visualize the processing
nk.ppg_plot(signals, info)
```



In [16]:
```
#Electromyography (EMG)
# Generate 10 seconds of EMG signal (recorded at 250 samples/second)
emg = nk.emg_simulate(duration=10, sampling_rate=250, burst_number=3)

# Process it
signals, info = nk.emg_process(emg, sampling_rate=250)

# Visualise the processing
nk.emg_plot(signals, info)
```



In [20]:
```
#Electrooculography (EOG)
# Import EOG data
eog_signal = nk.emg_simulate(duration=10, sampling_rate=250, burst_number=3)

# Process it
signals, info = nk.eog_process(eog_signal, sampling_rate=100)

# Plot
nk.eog_plot(signals, info)
```


Electrooculography (EOG)
Raw and Cleaned Signal
Individual Blinks
Amplitude (mV)
Raw
Cleaned
Blinks
Median
Blink Rate
Blinks per minute
Rate
Mean
Time (seconds)
Time (seconds)