

## ECU-3/6 EMC Control Unit

### Frequency range 9 kHz – 3/6 GHz



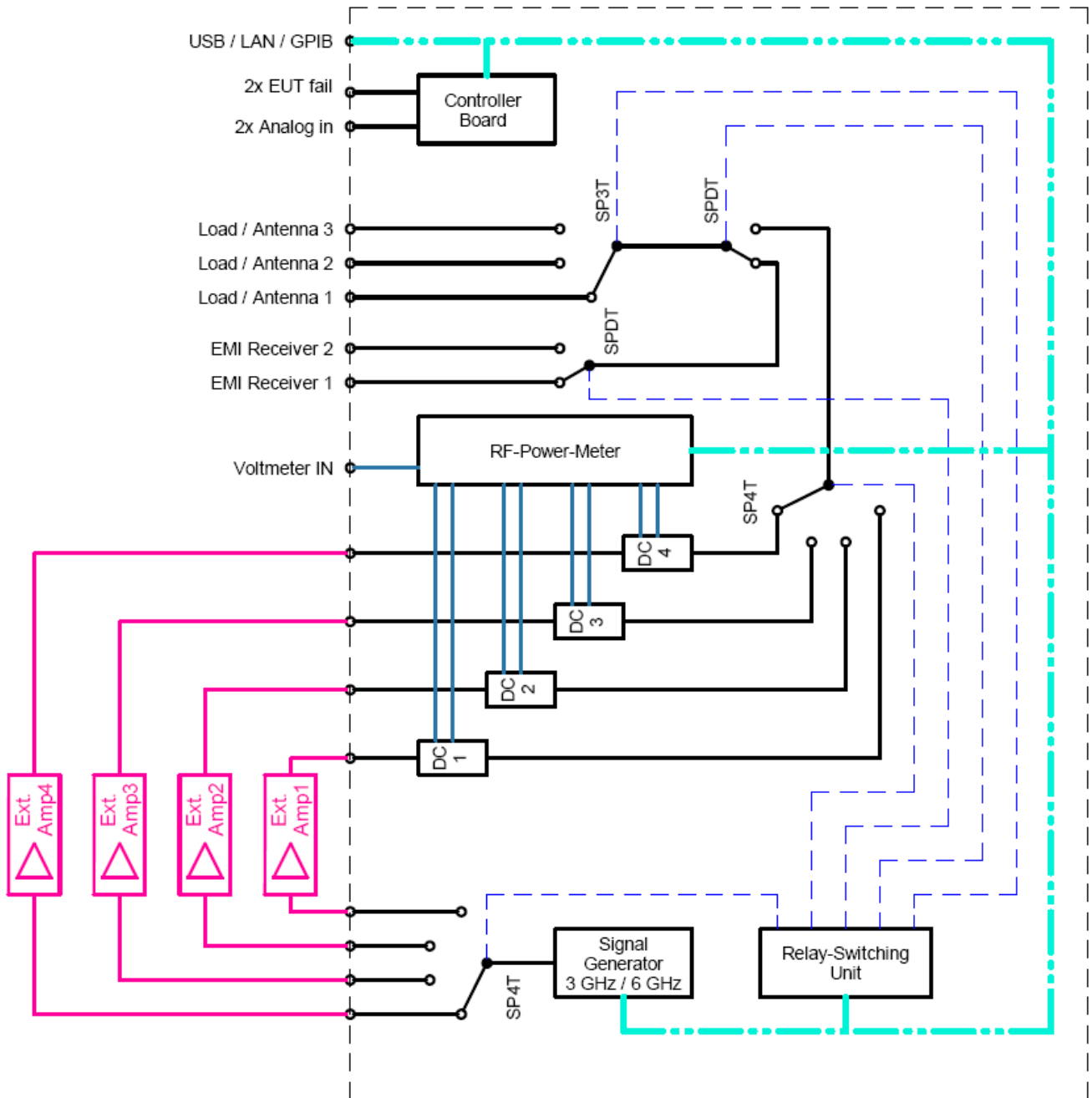
ECU is a central control unit for conducted and radiated immunity testing and emission measurement.

**It combines in one compact unit of only 4 Height Units:**

- Signal generator 9 kHz – 3/6 GHz
- Up to 9 power meters
- Up to 4 directional couplers
- Switching relays
- EUT-monitoring
- interlock

**Features:**

- Easy installation. Only optional connection of up to 4 external amplifiers and up to 2 measuring receivers/spectrum analyzers is necessary
- Switches emission and immunity path to up to 3 antennas/loads
- Interfaces to control PC: GPIB, USB, LAN (Ethernet)
- Optional control software CD-LAB, BCI-LAB, RF-LAB
- dII-driver allows easy integration into external and customer designed software
- Supports tests acc. to IEC/EN 61000-4-3, IEC/EN 61000-4-6, ISO 11452-2, ISO 11452-3, ISO 11452-4, ISO 11452-5, MIL STD 461 CS114, MIL STD 461 RS103, MIL STD 461 RE102 and emission standards



| <b>Specifications</b>    |   |  |
|--------------------------|---|--|
| <b>RF Generator</b>      | <b>ECU 3</b>  | <b>ECU 6</b>                             |
| Output                   | 50 Ohm, N male  |  |
| Output (Relay)           | 3x N male   | 4x N male                                |
| Frequency range          | 9 kHz to 3 GHz  | 9 kHz to 6,5 GHz                         |
| Frequency resolution     | 0,1 Hz  | 0,001 Hz                                 |
| Output level range       | -65 dBm to +10 dBm  | -100 dBm to +13 dBm                      |
| Output level resolution  | 0.1 dB  |  |
| Output level accuracy    | ±1 dB max   |  |
| Accuracy (frequency)     | ±5 ppm  | ±100 ppb                                 |
| Harmonics                | < -30 dBc   |  |
| Non harmonics            | < -55 dBc   |  |
| Amplitude modulation     |   |  |
| Modulation rate          | 1 Hz to 30 kHz; resolution 0,02 Hz  | 1 Hz to 20 kHz; resolution 0,1 Hz        |
| Modulation depth         | 0 to 90%; resolution 1%   | 0 to 90%; resolution 1%                  |
| Modulation waveforms     | sinusoidal, triangular, square  | sinusoidal, triangular, square           |
| Pulse modulation         |   |  |
| On/off ratio             | > 50 dB   | typ. 80 dB                               |
| Repetition frequency     | 0,1 Hz to 100 kHz   | 0,1 Hz to 100 kHz                        |
| Duty cycle               | 1 - 99 %; resolution 1%   | 1 - 99 %; resolution 1%                  |
| Frequency modulation     |   |  |
| Modulation rate          | ---   | 300 Hz to 300 kHz                        |
| <b>RF Power Meter</b>    |   |  |
| Number of channels       | 7   | 9  |
| Frequency range          | 10 kHz - 500 MHz (channel 1,2,7)  | 10 kHz - 500 MHz (channel 1,2,9)         |
| Frequency range          | 100 kHz - 6000 MHz (channel 3,4,5,6)  | 100 kHz - 6000 MHz (channel 3,4,5,6,7,8) |
| Measuring range          | -60 dBm - +20 dBm (10 kHz ≤ f ≤ 4 GHz)<br>-45 dBm - +20 dBm (4 GHz < f ≤ 6 GHz) |  |
| Accuracy                 | ± 1 dB (0,5 dB typical)   |  |
| Resolution               | 0.1 dB  |  |
| Max. input level         | +27 dBm (= 500 mW)  |  |
| VSWR                     | 1,15  |  |
| <b>EUT-fail input</b>    | 2x TTL/CMOS compatible,   |  |
| Input resistance         | 2.2 kΩ  |  |
| Level                    | TTL/CMOS compatible, optical decoupled  |  |
| <b>EUT-Monitor input</b> |   |  |
| Input voltage (2x)       | 0 - 10 V  |  |
| Resolution               | 2.5 mV  |  |

|                           |  |  |
|---------------------------|--|--|
| Input impedance           | 100 k $\Omega$   |  |
| USB-A                     | Multimeter (for EUT control)   |  |
| USB-A                     |  |  |
| USB-A                     |  |  |
| <b>Remote control</b>     |  |  |
| USB-B                     | Connection to Computer   |  |
| GPIO / IEEE488            | Connection to Computer   |  |
| Ethernet / RJ45           | (Option)   |  |
| <b>Display</b>            |  |  |
| Displayed items           | Frequency, Power levels $P_{forw.}$ , $P_{ref.}$ , modulation (4 lines x16 characters) |  |
| <b>Coaxial Switches</b>   |  |  |
| max. power up to 100 MHz  | 2000 W   |  |
| max. power up to 600 MHz  | 1000 W   |  |
| max. power up to 1000 MHz | 700 W  |  |
| max. power up to 3000 MHz | 400 W  |  |
| max. power up to 6000 MHz | 300 W  |  |
| <b>General data</b>       |  |  |
| Temperature range         | 0 to 40 °C   |  |
| Warm-up time              | 15 min   |  |
| Housing                   | 19" Subrack or desktop case  |  |
| Dimension (W x H x D)     | 449 mm / 177 mm / 580 mm   |  |
| Weight                    | approx. 15 Kg  |  |
| AC Input                  | 100 - 240 VAC; 50/60 Hz  |  |
| <b>Volume of delivery</b> |  |  |
|                           |  |  |

## Ordering Information:

### Basic Instrument:

|        |                  |               |
|--------|------------------|---------------|
| ECU-3: | EMC Control Unit | 9 kHz – 3 GHz |
| ECU-6: | EMC Control Unit | 9 kHz – 6 GHz |

### Switching Options:

|           |  |
|-----------|--|
| ECU-OUT2: | Switching between 2 outputs Antenna/ Load  |
| ECU-OUT3: | Switching between 3 outputs Antenna/ Load  |
| ECU-REC1: | Switching to emission path and connection of 1 measuring receiver/ spectrum analyzer   |
| ECU-REC2: | Switching to emission path and connection of 2 measuring receivers/ spectrum analyzers |

### Power meter/ RF-Millivoltmeter: (ECU-3: max. 7 channels, ECU-6: max. 9 channels)

|         |                         |                               |
|---------|-------------------------|-------------------------------|
| ECU-PM1 | Power Meter (1 channel) | Measuring input: 10kHz-500MHz |
| ECU-PM2 | Power Meter (1 channel) | Measuring input: 100kHz-6GHz  |

### Internal directional couplers: (ECU-3: max. 3 couplers, ECU-6: max. 4 couplers):

|           |                     |                            |
|-----------|---------------------|----------------------------|
| ECU-DC1A: | Directional Coupler | 10kHz -250MHz, 30dB, 100W  |
| ECU-DC1B: | Directional Coupler | 10kHz-400MHz, 30dB, 100W   |
| ECU-DC1C: | Directional Coupler | 10kHz-250MHz, 40dB, 500W   |
| ECU-DC2:  | Directional Coupler | 80MHz-1000MHz, 50dB, 1500W |
| ECU-DC3:  | Directional Coupler | 1GHz-4GHz, 40dB, 600W      |
| ECU-DC4:  | Directional Coupler | 2GHz-8GHz, 40dB, 600W      |

### Others:

|          |                                      |
|----------|--------------------------------------|
| ECU-LAN: | additional PC-interface LAN/ETHERNET |
| ECU-RI:  | 19"-Rack version                     |

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