

# Electronic 8 Channel Spectral Sensor Multiplexer

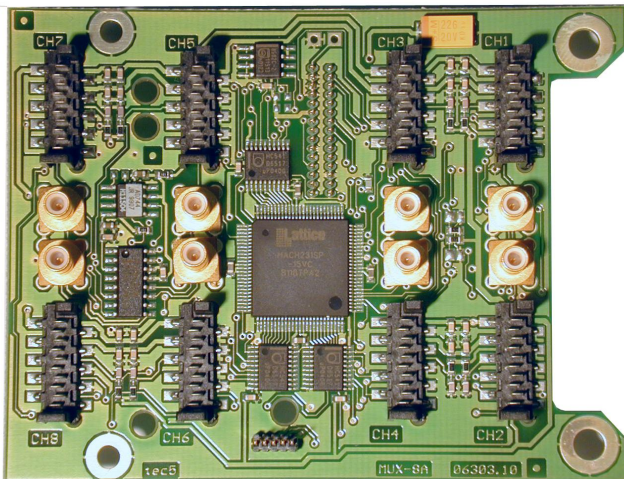
## MUX-8A for FEE-HS

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### Short Description

- § Active input multiplexer for Front End Electronics FEE-HS
- § 8 sensor input channels
- § Mode 'sequential': 1 of 8 channels
- § Mode 'simultaneous': Fixed channel combinations Ch1&Ch2, Ch1&Ch2&Ch3, up to Ch1&Ch2&Ch3&Ch4&Ch5&Ch6&Ch7&Ch8
- § Input from device: Spectral Sensor or Preamp.
- § Output to device: Front End Electronics
- § Typically mounted as sandwich board on Front End Electronics
- § PCB dimensions 87 mm x 67 mm (FEE form factor)

### General

In conjunction with the Front End Electronics FEE-HS the Electronic Spectral Sensor Multiplexer MUX-8A allows to operate up to 8 identical sensor units (PDAs with Pre-amplifier Electronics or Spectral Sensors based on these arrays).

In the signal chain following the multiplexer, signals from all sensors pass identical circuitry for video data processing and analog-to-digital conversion, so that all measurement channels are influenced in an identical manner by potential inaccuracies of electronics.

The sensor interface corresponds to specification 'Sensor\_1A'. The interconnection to each sensor module is done by a miniaturized coax line and a 10-pin flat ribbon cable.

### Operating Modes

In mode of operation 'sequential', the multiplexer acts like a static input switch for up to 8 sensor modules attached. The size of a spectral data array is equal to the number of pixels of the active sensor.

In the operation mode 'simultaneous', a predefined combination of two to eight sensors can be read out almost concurrently with the MUX-8A. To achieve this, the multiplexer interleaves the spectral data of the single sensors pixel by pixel. So, the scans are overlapping with a time shift of only one pixel readout clock (approx. 5  $\mu$ s with FEE-HS). The selectable combinations are Ch1&Ch2, Ch1&Ch2&Ch3, Ch1&Ch2&Ch3&CH4 until Ch1&Ch2&Ch3&CH4&Ch5&Ch6&Ch7&CH8. The size of a spectral data array is equal to the sum of the number of pixels of all the active sensors.

The multiplexer operating mode (the active sensor or the combination) is selected by software and transferred to the MUX-8A via the Front End Electronics of the Operating Electronics.

### Supported Sensors

The following compatible sensor modules are currently available:

- MMS - Spectral Sensors (not MMS NIR)
- MCS - Spectral Sensors (equipped with Pre-amplifier Electronics type DZA-S3901-4)
- the Pre-amplifier Electronics DZA-S3901-4

### Additional Features

- Local non-volatile memory  
256 Bytes capacity
- MUX-8A can not be used together with the Spectral Sensor Controller Unit MOE-C161

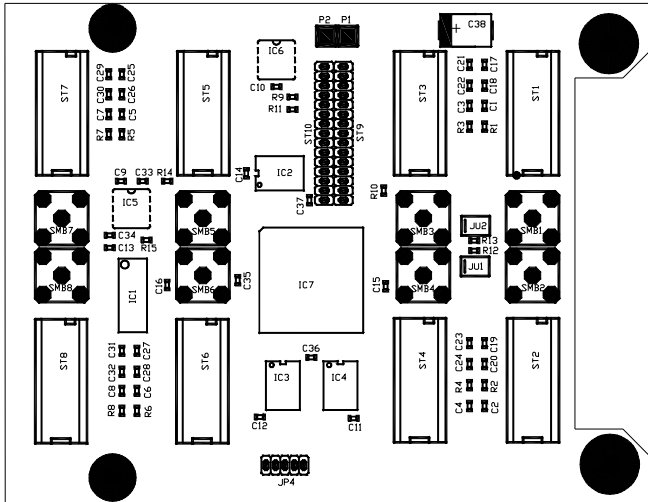
#### Power consumption:

- +5V\_analog / -5V\_analog: current of sensors only
- V<sub>CC</sub>(+5V\_digital): typical < 110 mA
- +12V\_analog: typical < 5mA
- -12V\_analog: typical < 5mA

#### Environmental conditions:

- Temperature range, operating: 0 °C ... 60 °C
- Temperature range, storage: -40 °C ... +70 °C
- Humidity (@25°C, non condensing): 10 % ... 90 %

## Design



## Interfaces

### Sensor interface:

- Channel 1: SMB1 and ST1
- Channel 2: SMB2 and ST2
- Channel 3: SMB3 and ST3
- Channel 4: SMB4 and ST4
- Channel 5: SMB5 and ST5
- Channel 6: SMB6 and ST6
- Channel 7: SMB7 and ST7
- Channel 8: SMB8 and ST8

### Connector type:

- SMBx: SMB flange socket
- STx: MICS 10  
'Sensor\_1A' compatible

### STx: Channel x

STx Pin or SMB	Input / Output	Description
1	---	Not connected
2	Output	Sensor StartScan
3	---	Digital Ground
4	Output	Sensor Clock
5	---	Digital Ground
6	Input	Sensor EndofScan
7	---	Digital Ground
8	Output (Supply from FEE)	-5V power supply for sensor
9	---	Digital Ground
10	Output (Supply from FEE)	+5V power supply for sensor
SMB	---	Analog Ground
SMB	Input	Sensor Video signal (center contact)

### Front End Electronics interface:

#### Connector type:

ST9 (right column) / ST10 (left column): Header connector 2x15 (pattern 1.27mm), pin contacts on solder side

ST9 Pin	Description
1	open
2	Reserve signal from/to PLD, not used by MUX-8A

3	Reserve signal from/to PLD, not used by MUX-8A
4	open
5	Reserve signal from/to PLD, not used by MUX-8A
6	Input, multiplexer operation mode from FEE
7	Input, multiplexer main clock from FEE
8	Reserve signal from/to PLD, not used by MUX-8A
9	Input, start of scan signal from FEE
10	Output, end of scan signal to FEE
11	Input, multiplexer secondary clock from FEE
12	Input, delayed start of scan for latching 'multiplexer operation mode' and 'input channel select controls'
13	Digital Ground
14	Output Analog Video
15	Analog Ground

ST10 Pin	Description
1	Reserve 2, linked to MUX-8A pin P1
2	Identification Multiplexer Type, ID1, tied to Ground
3	Digital Ground, linked to MUX-8A pin P2
4	Digital Ground
5	+12V_analog supply voltage input
6	VCC (+5V_digital) supply voltage input
7	Input channel select control line 0
8	Input channel select control line 1
9	Input channel select control line 2
10	Identification Multiplexer Type, ID0, tied to Ground
11	I2C Bus line, clock signal
12	I2C Bus line, data signal
13	-5V_analog supply voltage input for sensors
14	+5V_analog supply voltage input for sensors
15	-12V_analog supply voltage input

**Remark:** Signal assignment of the Front End Electronics to multiplexer connector varies for different multiplexer types. Assignment is switched by the Front End Electronics depending on the multiplexers identification information.

## User Information

### General

The information in this data sheet has been checked carefully. However, no responsibility is assumed for inaccuracies. tec5 reserves the right to make changes to any portion of this document without notice.

Each product is tested carefully before being shipped. If, however, problems should occur while initial operation or during later operation, please first check your specific settings and correct installation (connectors).

### Warranty

The warranty period for this product is 12 months. The warranty begins on the day of delivery. Within the warranty period, tec5 will repair free of charge any faulty functioning of the product resulting from faulty design or defective material. All other claims are excluded, in particular consequential damage.

### Handling

The electronics is partly constructed in CMOS technology and is thus sensitive against electrostatic discharge. Take appropriate precautions whenever handling the component. Please switch off the power before connecting or disconnecting the product.