

MT32 Telemetry

Multi channel telemetry system for rotating application



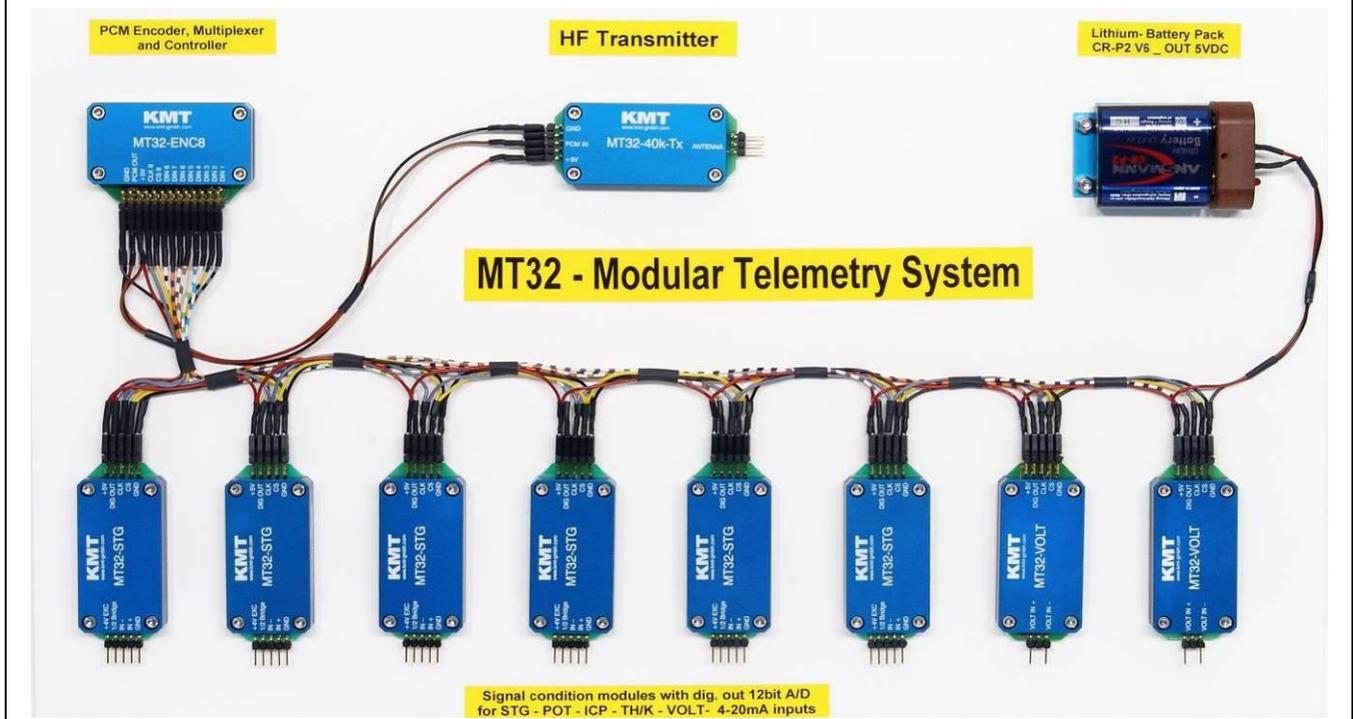
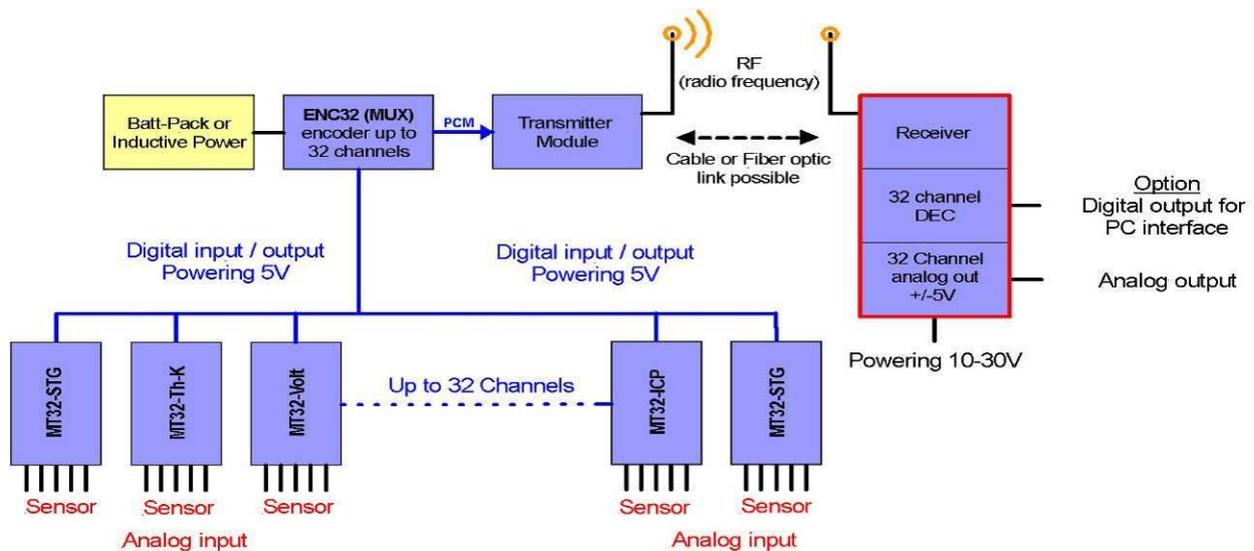
- Up to 32 channel
- Sensor inputs for STG, POT, TH-K, Pt100, 4-20mV, ICP or VOLT
- STG - Auto Zero calibration
- Anti aliasing filters
- 12 bit ADC resolution
- Signal bandwidth up to 0...24000Hz
- Powering (rotor) by battery or inductive
- Digital inductive or radio transmission
- Distance up to 10m (Radio Tx)
- Easy to assemble and operate
- Output +/-5V add. 4-20mA (Option)
- System accuracy <0.25%
- Digital PCM interface for PC

Short description:

The MT32 Mini-Telemetry is a very small and flexible telemetry system for rotating, mobile and stationary applications. Each sensor module is equipped with signal conditioning, anti-aliasing filters, analog-to-digital converters and a digital output. All these up to 32 modules will be controlled by an encoder (multiplexer with PCM output) module. By this concept it's possible to install the acquisition modules close to the sensor to have short connections for the analog sensor lines. This avoids an undesired coupling of disturbances resulting in noisy signals. The interference insensitive digital outputs then can lead over wider distances of up to 5m to the encoder module. The encoder output is a PCM bit stream signal which can be modulated for emission by a transmitter module.

To support a wide range of applications there are different HF- transmitter types available. This includes different distances (short and long), transmission rates (40, 320, 640, 1280 or 2560kbit/s). Please send us an exactly description of your application with a simple block diagram. This ensures to provide you a proposal for an optimal solution.

The supply voltage for the transmitting part is 5V DC. It can be generated by batteries, inductive or mains power supplies (depends on application). Optional it's also possible to combine all signal acquisition modules, encoder, transmitter and batteries in a small housing as a compact ready-to-use telemetry system (CT8-16). For strain gage applications the offset can be compensated by potentiometer on the acquisition module or optional by auto-zeroing via a micro switch on the encoder simultaneously for all modules. The calibration settings are not affected during power off. The receiver station outputs the signals in a $\pm 5V$ full-scale range via BNC connectors. It will be powered with 10-30V DC or optional by an external mains power supply with 110-230V AC.



MT32 acquisition modules



52 x 27 x 11 mm
Weight 20 grams

MT32-STG V1

For strain gages
Full and half ($\geq 350\Omega$)
(quarter bridge only with external completions resistor!)
Fixed excitation 4V DC
Offset calibration via potentiometer or optional auto-zeroing
Gain 200 or 1000
Anti aliasing filter
Resolution 12bit = 72dB dynamic range
Accuracy <0.25%
Consumption of current: 20mA



52 x 27 x 11 mm
Weight 20 grams

MT32-POT

For all potentiometer values
350Ohm to 10kOhm
Excitation: 4 VDC (fixed)
Resolution 12bit = 72dB dynamic range
Anti aliasing filter
Accuracy <0.25%
Consumption of current: 20mA



52 x 27 x 11 mm
Weight 20 grams

MT32-STG V2

For strain gages
Full and half ($\geq 350\Omega$)
(quarter bridge only with external completions resistor!)
Fixed excitation 4V DC
Offset calibration via potentiometer or optional auto-zeroing
Gain: 250-500-1000-2000 or 1000-2000-4000-8000
Specify at order
Anti aliasing filter
Resolution 12bit = 72dB dynamic range
Accuracy <0.25%
Consumption of current: 26mA



52 x 27 x 11 mm
Weight 20 grams

MT32-PT100

For thermo resistors
Range -100 ... +500 °C
Resolution 12bit = 72dB dynamic range
Accuracy <0.25%
Consumption of current: 5mA



52 x 27 x 11 mm
Weight 20 grams

MT32-ICP

For ICP® sensor inputs
(Max. input range at gain $2x = \pm 2.5V$)
Current exc. **4mA** (optional 1mA)
Signal gain x 2, 4, 8, 16 and 32 (optional x 1, 2, 4, 8 and 16)
Signal bandwidth 3 Hz up to 12000Hz* (*dependent of the max. cut of frequency)
Resolution 12bit = 72dB dynamic range
Accuracy <0.25%
Consumption of current: 50mA



52 x 27 x 11 mm
Weight 20 grams

MT32-VOLT

For high level inputs $\pm 5V$ or $\pm 10V$
Resolution 12bit = 72dB dynamic range
Accuracy <0.25%
Consumption of current: 10mA

Optional Volt ISO available with galvanic isolated inputs



52 x 27 x 11 mm
Weight 20 grams

MT32-TH K-ISO

For thermo couples type K **(with galvanic isolation!)**
Range -50 to 1000 °C (other range on request)
Resolution 12bit = 72dB dynamic range
Bandwidth 0-10Hz
Accuracy <1%
Consumption of current: 12mA

MT32 power supply rotating part



52 x 27 x 11 mm
Weight 20 grams

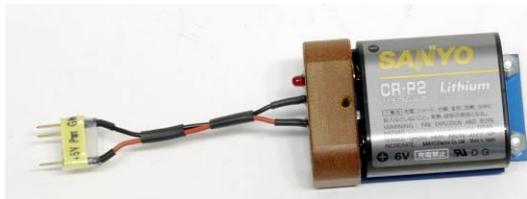
DC/DC PWR 5V-1000

Input 7...30V DC
Output 5V DC
Max. current 1000mA



Lithium battery from SAFT:
2x LSH14, 3.6V each, 5800mAh
2x 3.6V = 7.2V with 5800mAh
or
2x LSH20, 3.6V each, 13000mAh
2x 3.6V = 7.2V with 13000mAh

**This is only a recommendation!
The use of lithium batteries follow at one's own risk!!**



58 x 35 x 21 mm
Weight about 60gram

MT32-BATT-PACK

Input 6V via Lithium battery
for CR-P2 6V 1500mAh/h
Output 5V DC
Low BATT LED display
Max. current 300mA

**This is only a recommendation!
The use of lithium batteries follow at one's own risk!!
Batteries must be purchased in your own country!**



IND-Pwr-AC/DC module

52 x 27 x 11 mm
Weight 20 grams

MT32- inductive AC/DC PWR 5V

Input: 30-60kHz, 10-50V AC or 24 DC
Output 5V DC
Max. current 1000mA

For inductive IND-PWR AC/DC module is an additional power supply necessary!



MT32 encoder and decoder



52 x 27 x 11 mm
Weight 20 grams

MT32-ENC8
PCM encoder module for linking the data of up to 8 SC modules to one PCM bit stream for transmission
Consumption of current: 20mA



65 x 105 x 230 mm - Weight 1000 grams

MT32-DEC8
Receiver for up to 2, 4 or 8 channels
±5V output range on female BNC
Total system accuracy ±0,25% without sensors
Powering 10–30V DC or optional 110-230V AC (50Hz-60Hz) with AC/DC adaptor



52 x 27 x 11 mm
Weight 20 grams

MT32-ENC16
PCM encoder module for linking the data of up to 16 SC modules to one PCM bit stream for transmission.
Consumption of current: 20mA



MT32-DEC16
65 x 105 x 230 mm
Weight 1000 grams



Option :BNC16

MT32-DEC16
Receiver for 16 channels
±5V output range
Output 37pol. Sub D
Total system accuracy ±0,25% without sensors
Powering 10–30V DC or optional 110-230V AC with AC/DC adaptor

Option: BNC16, adaptor Box
37 Sub-D to 16 x BNC Outputs

MT32 transmitter module



52 x 27 x 11 mm
Weight 20 grams

MT32-IND-Tx-2560k
Inductive data transmission transmitter
Total sampling rate 160 kS/s
Transmission rate 2560kbit/s
Distance up to 0.1m (>100mm)
Consumption of current: 15mA



52 x 27 x 11 mm
Weight 25 grams

MT32-IND-Tx-45MHz-2560k
Inductive data transmission transmitter with **45MHz carrier** (for noise environmental areas!)
Total sampling rate 160 kS/s
Transmission rate 2560kbit/s
Distance up to 0.1m (>100mm)
Consumption of current: 70mA



52 x 27 x 11 mm
Weight 23 grams

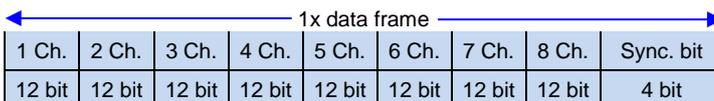
MT32-40k (320-640-1280k available)
Range 10m on rotating applications.
Total scanning rate 2,5 kS/s
Transmission rate 40kbit/s
Transmission power 10mW
Consumption of current: 40mA

Cut off frequency from anti-aliasing filter (-3dB), scanning rate (red), latency time (brown) analog IN/OUT

Bit rate	2 Channels	4 Channels	8 Channels	16 Channels	32 Channels
2560 kbit/s	24000Hz (91428 Hz) 0.079ms	12000 Hz (49231 Hz) 0.149ms	6000 Hz (25600 Hz) 0.29ms	3000 Hz (13061Hz) 0.56ms	1500 Hz (6598Hz) 1.108ms
1280 kbit/s	12000 Hz (45714 Hz) 0.154ms	6000 Hz (24615 Hz) 0.295ms	3000 Hz (12800 Hz) 0.57ms	1500 Hz (6530 Hz) 1.11ms	750 Hz (3298 Hz) 2.23ms
640 kbit/s	6000 Hz (22857Hz) 0.305ms	3000 Hz (12308 Hz) 0.578ms	1500 Hz (6400 Hz) 1.12ms	750 Hz (3265 Hz) 2.24ms	375 Hz (1649 Hz) 4.6ms
320 kbit/s	3000 Hz (11428 Hz) 0.597ms	1500 Hz (6154 Hz) 1.14ms	750 Hz (3200 Hz) 2.26 ms	375 Hz (1632 Hz) 4.64ms	190 Hz (824 Hz) 9.1ms
40 kbit/s	375 Hz (1428 Hz) 4.9ms	190 Hz (770 Hz) 9.4ms	95 Hz (400 Hz) 17.8ms	47 Hz (204 Hz) 35,0ms	23 Hz (103 Hz) 69.3ms

Scanning rate, signal bandwidth and frame length depending on bit rate and number of channels

Frame example with 8 channels as following: 8Ch x12 bit = 96 bit + 4 bit sync. = 100 bit



= bit rate 100 bit

- 32 Ch. x 12 bit = 384 bit + 4 bit sync. = 388 bit
- 16 Ch. x 12 bit = 192 bit + 4 bit sync. = 196 bit
- 8 Ch. x 12 bit = 96 bit + 4 bit sync. = 100 bit
- 4 Ch. x 12 bit = 48 bit + 4 bit sync. = 52 bit
- 2 Ch. x 12 bit = 24 bit + 4 bit sync. = 28 bit

Scanning you can calculate e.g.: 40kbit transfer rate, 8 Ch. = 40000 : 100bit = 400Hz per Ch.

Environmental:

Rotating Part (blue modules):



- Operating Temperature -20 – +80°C
- Storage Temperature..... -30 – +90°C
- Humidity (non-condensing)..... 20 – 80%
- Vibration 5g Mil standard 810C, curve C
- Shock & static acceleration (in any direction) 3000g

Receiving Part:

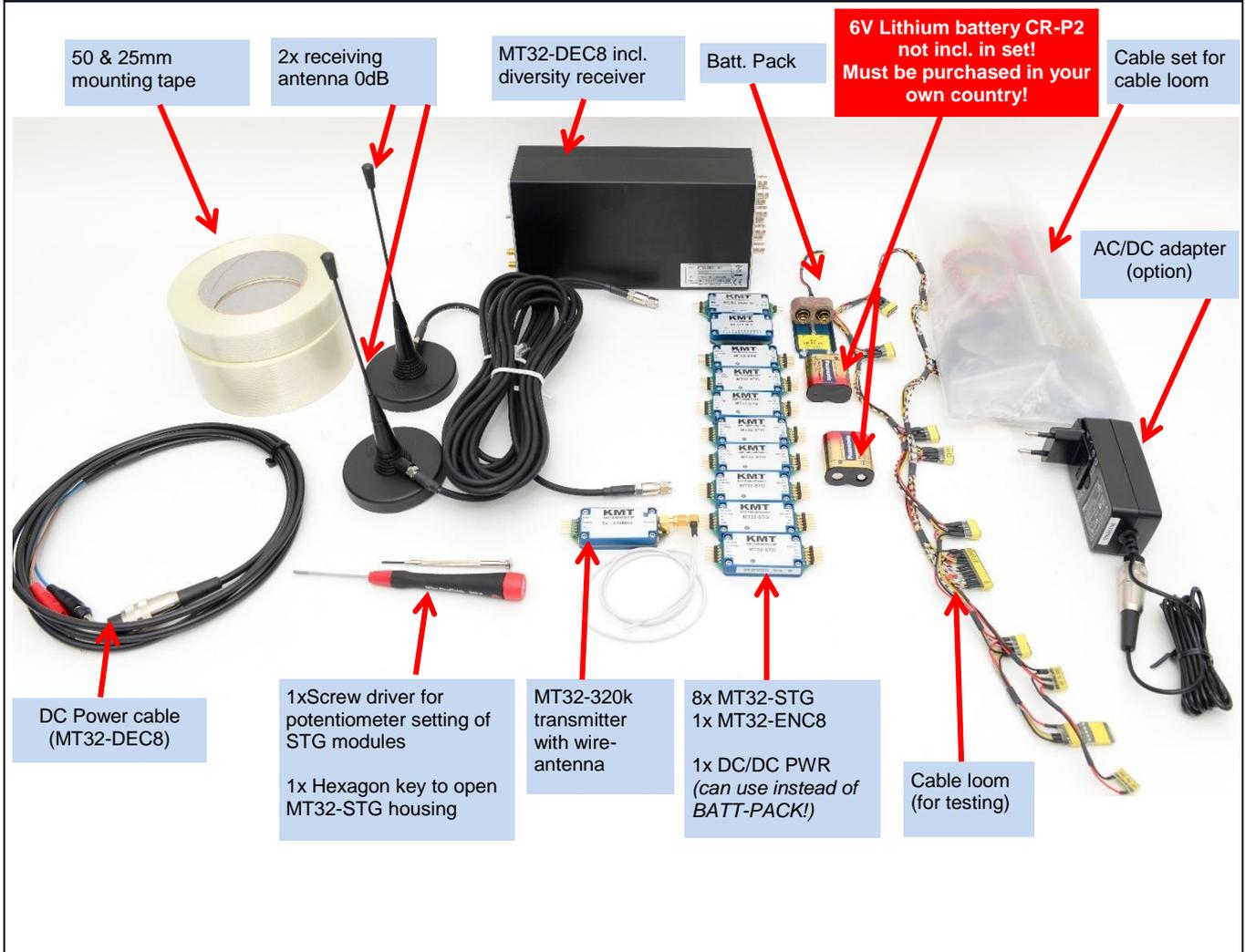


- Operating Temperature -10 – +70°C
- Storage Temperature..... -20 – +80°C
- Humidity (non-condensing)..... 20 – 80%
- Vibration 5g Mil standard 810C, curve C
- Shock (in any direction) 100g

Application

Streetcar wheel	Railway wheel	Railway wheel	Railway wheel
			
Belt disk of car	Drive shaft of ship engines	Shaft of wind power plant	Test rigs
			
Drive shaft of wheel loader	Force measurements	24kHz data transmission TTL	Special solution for force test at milling machine
			

MT32 - 8 channel set with battery power and 320kbit diversity radio telemetry (picture show only an order example)

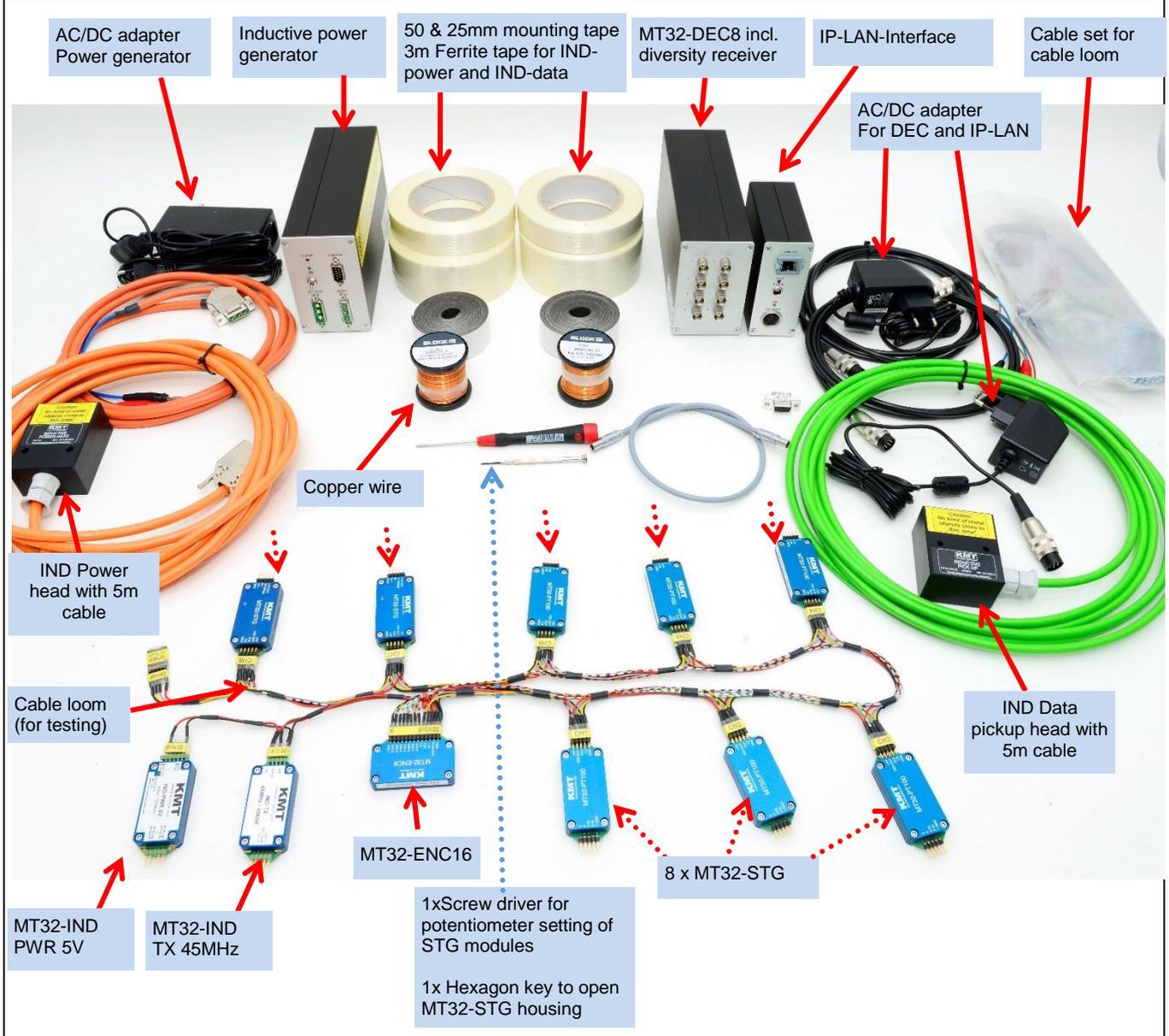


Order example: MT32-8CH-320k, 8xSTG, BATT, BW 8x0-750Hz

8	MT32-STG-V2	NEW	MT32-8CH-320k-DIV, 8xSTG, BATT, BW 8x0-750Hz Signal conditioning module for strain gages - gain 250-500-1000-2000
1	MT32-ENC8		Encoder for up to 8 acquisition module
1	MT32-CABLE-LOOM8		Cable loom for 8 channels
1	MT32-CABLE-SET 8		Wire (10m each) in different colors for self-made cable loom for 8 channels
1	MT32-320k-10-DIV		RF telemetry transmitter and diversity receiver with 320kbit (20kS/s)
1	BATT-PACK		Battery pack
1	MT32-DEC8		Decoder for 8 channels, Output 8 x BNC
1	AC/DC		AC/DC power supply for DEC8 (Optional)

MT32 - 8 channel set with inductive power and 2560kbit inductive transmitter

(picture show only an order example)



Order example: MT32-8CH-IND-TX-RX 45MHz, 8xSTG, IND-PWR, BW 8x0-6000Hz

8	MT32-STG-V2 NEW	Signal conditioning module for strain gages - gain 250-500-1000-2000
1	MT32-ENC8	Encoder for up to 8 acquisition module
1	MT32-CABLE-LOOM8	Cable loom for 8 channels
1	MT32-CABLE-SET 8	Wire (10m each) in different colors for self-made cable loom for 8 channels
1	MT32-IND-TX-RX-45MHz	Inductive telemetry transmitter and receiver, 45MHz carrier, 2560kbit
1	IND-PWR-XL	Inductive power supply
1	MT32-DEC8	Decoder for 8 channels, Output 8 x BNC
1	MT32-DEC-DIG-IP-LAN	Digital decoder with PCM-LAN-IP interface
1	RLAB-VL-Win	RemusLAB Full-License data acquisition software
2	AC/DC	AC/DC power supply for DEC8 and IP LAN Interface
1	AC/DC-24V-2.5A	AC/DC power supply 65 WATT for IND-Power Supply L/XL