

# Delivery programme

Edition 2011/2012



**M2M Applications**

**Wireless Modules & Accessories**

**Connection technology**

**Cable and system solutions**

**Test and measurement**



## Company Profile / Portfolio

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### Company profile

MC Technologies GmbH is a leading European supplier of innovative solutions for:

- Machine-to-Machine (M2M) applications via mobile networks for business customers
- Customized cable manufacturing
- Distribution of electromechanical elements and components from selected and certified partners

Due to our more than 60 years of experience in telecommunications we offer:

- A high qualified competence
- A rapid and professional implementation of all commercial and logistic processes
- A comprehensive service concept for all of our products und solutions

### Portfolio

#### M2M Application

M2M Communication is the automated exchange of information between technical end-devices such as machines, vehicles or containers and a central control centre.

Our portfolio includes embedded wireless software, wireless modules, integratable units and application software. Thanks to additional R&D capacities we also offer the option of optimally integrating our solutions into customer-specific requirements for an end-to-end solution.

#### Connection technology

We keep a well equipped connector warehouse boasting over 12,000 different types. Distribution contracts with market leaders guarantee us a high level of productivity. We also provide you with a qualified team of consultants who will competently guide your project from the first development phase through to the final inspection. The individual manufacture of connector systems turns the sale of connectors into a complete service.

Products for industrial automation and components complete our range.

#### Wireless Modules

For the implementation of M2M applications, optimally coordinated hardware solutions in the wireless modules sector are elementary. Due to our many years of experience, our wireless module team can provide you with deeply rooted expert knowledge on our entire hardware product portfolio.

This includes various types of engines – terminals, data modules for implementation in existing systems, industrial PC plug-in cards, etc – as well as a wide range of service characteristics; e.g. HSDPA/EDGE/GPRS/ GPS/JAVA™.

The range is completed by an extensive accessories portfolio which includes our high performance special antenna, adapters and cables.

#### Measurement and testing technology

High performance, value-for-money measurement and testing devices that comply with DIN VDE regulations and/or European Standards are available within our delivery programme. Qualified, competent advisors are available if you have any questions or need any assistance. Related software completes our range.

## MC Technologies quality

A principal purpose of MC Technologies is to win the trust and the satisfaction of our customers and to receive with lasting effect. This corporate strategy and high-class politics form the basis for the definition of our high-class aims.

As higher business objectives the following aims were fixed:

- Logical alignment of all activities to the increase of the customer satisfaction
- Continuous high-class improvement
- Support and motivation of our members of staff
- Fair cooperation with suppliers
- Economic action
- Maintenance of a living quality management system after German Institute for Standardization (DIN) EN ISO 9001:2008



## Customer-specific assembly

MC Technologies is your partner for cable assembly. Thanks to our many years of experience, we can assemble cables of the highest quality according to your specifications. All customer-specific assemblies comply with current guidelines and can be delivered in all quantities from small series to large, complete solutions. When assembling your cables we place great value on deadline compliance, flexibility and reliability.



## Construction element manufacture

The worldwide implementation of large numbers of our modules sets the benchmark for their quality. As well as maximum precision during manufacture, it is also important to continuously check every step of the process with regard to efficiency and quality increase. Here it is important to ensure a systematic approach; i.e. efficient cooperation between all system components (modules, antenna, SIM cards, accessories) so that the customer receives a technically efficient, functioning unit.



## Training

The rapid growth of new technology and the applications derived from it requires continuous training both internally, externally and on the part of the customer. We have therefore made it our aim to pass our knowledge on to our customers in order to generate optimised hardware and software-orientated industry solutions together.

**MC Technologies MC66 Terminal**

**GSM/GPRS M2M Terminal** *Universal industrial terminal based on BG2*



**MC Technologies GSM/GPRS/GPS Terminals**

**Track and communication terminal**

*Available with Cinterion modules XT65, XT75, EGS5*

**MC Technologies MC88 / MC88i Terminal**

**GSM/GPRS M2M JavaTerminal**

*Universal Industrial terminal with integrated EGS5*

**MC Technologies GSM/ GPRS Terminals**

*Available with Cinterion modules AC75i, AC65i, MC75i, MC55i, TC65i, TC63i, EGS3, EGS5, EES3, XT75, XT65 and GSM-R Modul TRM3*



**MC Technologies UMTS HSPA Terminal**

**UMTS terminal that supports the HSDPA standard**

*Available with Cinterion modules HC25, HC28, PH8*

**MC Technologies GPIO Terminal**

**JavaTerminal with GPIO adapter**

*Available with Cinterion modules XT65, XT75, EGS5, TC65i*



**MC Technologies PCI Card**

**GSM/GPRS Terminal for PCI bus**

*Available with Cinterion modules PH8, AC75i, AC65i, MC75i, TC65i, TC63i*

**MC Technologies PC104 Card**

**GSM/GPRS Terminal for PC104 systems**

*Available with Cinterion modules MC75i, TC65i, TC63i, MC55i und GSM-R Modul TRM3*



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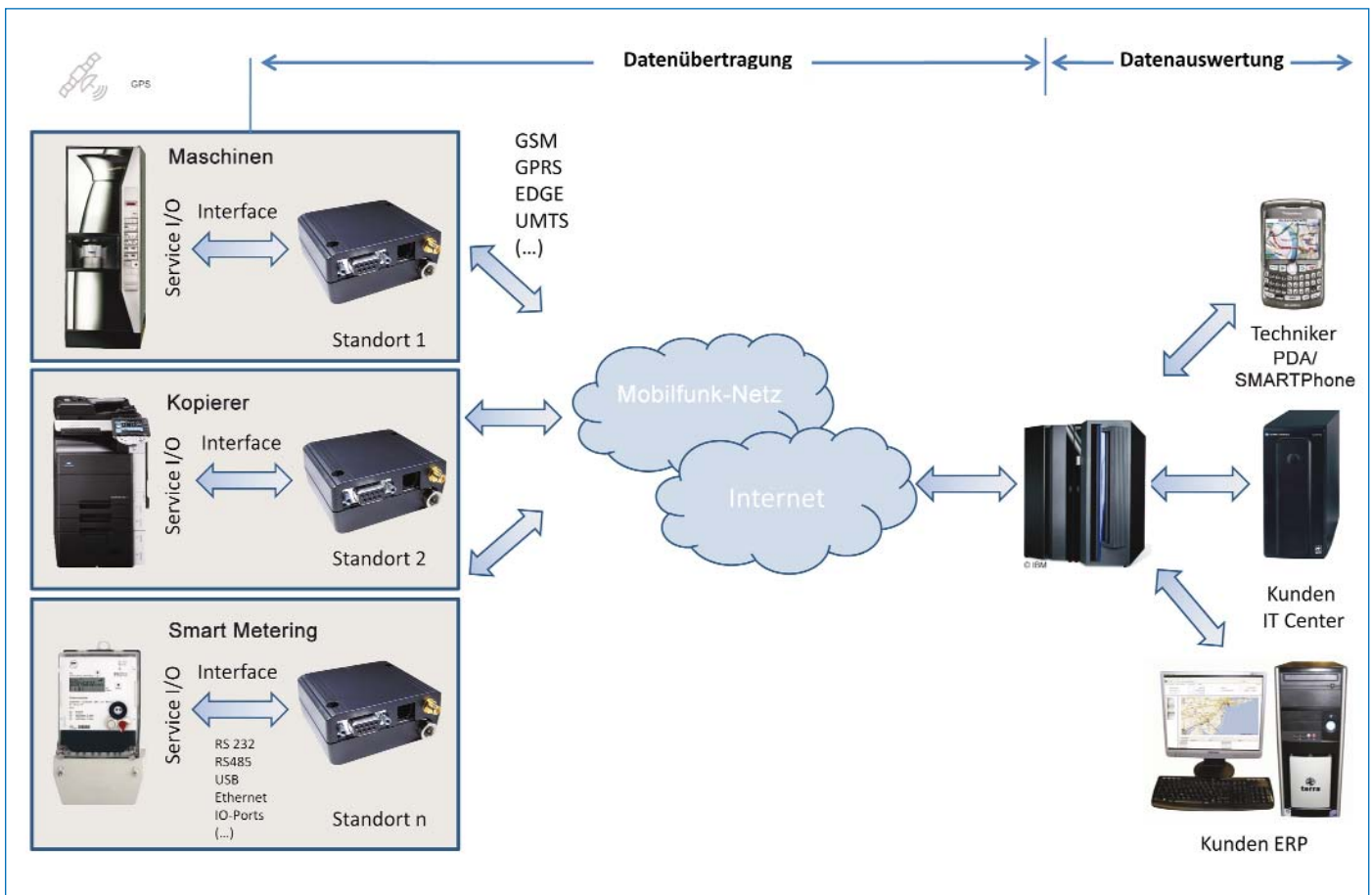
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# M2M - Wireless connection of machines



## Benefits

- ❑ **Efficiency:** with one single server, connections with up to 80,000 machines can be permanently monitored online
- ❑ **Speed:** a status request of 10,000 machines occurs within a few seconds.
- ❑ **Optimised data volume:** data pre-processing within the terminal significantly reduces the reference data to be transferred; transmission costs < €5 per month!
- ❑ **Location independent:** mobile communications technology is available almost everywhere which makes it possible to monitor almost any machine; Plug&Play installation with no cable extensions necessary!
- ❑ **Access independent:** no customer LAN is required to connect machines. This means independency from the firewall and the IT administration of the customer.

## Technical Data

- ❑ SSL-Encryption
- ❑ GPRS-Connection monitoring
- ❑ Automatic Provider Connection Settings (APN, Username, Password)
- ❑ Plug and Play configuration Eventbased
- ❑ Multi-Client / -User capable
- ❑ User Right Management
- ❑ Software update via OTAP (Over the Air Provisioning)
- ❑ Database Interface
- ❑ XML Export Interface
- ❑ Cluster Ready
- ❑ Optional Webinterface
- ❑ Operating System: Windows, Linux, Solaris
- ❑ Interfaces: RS232, RS485, USB, Ethernet, I/O-Ports, ...
- ❑ Java Runtime Environment Version 6 or higher
- ❑ QL Database, e.g. MySQL, PostgreSQL or Microsoft SQL Server

# Intelligent networking of java-enabled GPRS modules

## Practical examples of M2M



### Track & Trace for vehicles and mobile equipment

#### Description:

- Transfer of GPS position data from a vehicle to a central office or transport headquarters through a mobile wireless data terminal
- Transfer of additional information to a central office (driver ID, status information)

#### Applications:

- Route and transport order planning, order processing
- Fleet management and passenger information systems
- Electronic driver's logbook

#### Objectives:

- Theft protection and tracking
- Route optimization



### Vending

#### Description:

- Online telemetry for vending machines through a mobile wireless data terminal
- Remote control of vending machines

#### Applications:

- Vending machines for drinks and food
- Reverse vending systems for returnables

#### Objectives:

- Immediate notification of faults and malfunctions
- Automatic sales statistics
- Allows online cashless payment in realtime



### Remote Control of decentral equipment

#### Description:

- Online access to equipment and machines through a mobile wireless data terminal
- Transfer of service reports and measurement data to a central office

#### Applications:

- Equipment and plant with high service and maintenance costs
- Complex manufacturing processes
- Equipment pool

#### Objectives:

- Immediate and automatic notification of faults and malfunctions
- Real time transfer of measurement data / Remote configuration



### Smart Metering

#### Description:








- Remote reading of electricity / gas / water / heat meters through a mobile wireless data terminal
- Remote maintenance and remote control for housing and real estate management, power utilities and industry

#### Applications:

- Energy and power equipment

#### Objectives:








- Fully automatic determination of load profiles / billing systems
- Energy management








Product Family	M2M Evolution						
Product	EES3	EGS5	EGS3	BGS3	MC75i	TC65i	TC63i
	EDGE	Java™	GPRS	GPRS	EDGE	Java™	GPRS
							
Frequency Range	Quad-Band GSM/GPRS/EDGE	Quad-Band GSM/GPRS	Quad-Band GSM/GPRS	Quad-Band GSM/GPRS	Quad-Band GSM/GPRS/EDGE	Quad-Band GSM/GPRS	Quad-Band GSM/GPRS
Embedded processing		Java™				Java™	
GPS							
Dimensions	33.9x29.6x3.2mm	33.9x29.6x3.2mm	33.9x29.6x3.2mm	33.9x29.6x3.2mm	33.9x35x3.3mm	33.9x35x3.3mm	33.9x35x3.3mm
Temperature Range	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-40°C to +75°C	-40°C to +75°C	-40°C to +75°C
Voice	●	●	●	●	●	●	●
<b>Data Transmission</b>							
HSDPA							
UMTS							
EDGE	Class 12				Class 12		
GPRS	Class 12	Class 12	Class 12	Class 10	Class 12	Class 12	Class 12
CSD	●	●	●	●	●	●	●
SMS	●	●	●	●	●	●	●
Fax	●	●	●	●	●	●	●
TCP/IP connectivity	●	●	●	●	●	●	●
<b>Interfaces</b>							
Antenna Connector	via LGA pad	via LGA pad	via LGA pad	via LGA pad	U.FL-R-SMT	U.FL-R-SMT	U.FL-R-SMT
Antenna Solder Pad	via LGA pad	via LGA pad	via LGA pad	via LGA pad	●	●	●
Board-to-Board Connector					80-pin	80-pin	80-pin
Surface mounting	LGA	LGA	LGA	LGA			
Multi SIM interface	●	●	●	●	●	●	●
Audio analog/digital	2x/1x	2x/1x	2x/1x	2x/1x	2x/1x	2x/1x	2x/1x
Serial interfaces	2x	2x	2x	2x	2x	2x	2x
USB	●	●	●	●	●	●	●
I2C bus	●	●	●	●	●	●	●
SPI bus		●				●	
ADC/DAC		2x/1x				2x/1x	
Multiple GPIO's (digital)		●				●	
<b>Approvals</b>							
R&TTE, GCF	●	●	●	●	●	●	●
US approvals (FCC, UL, IC, PTCRB)	●	●	●	●	●	●	●
Japanese approvals (Jate, Telec)							
CE	●	●	●	●	●	●	●
Local operator certifications	●	●	●	●	●	●	●
e-mark							
<b>Special features</b>							
Over-the-air update		●				●	
RLS-Monitor (Jamming Detection)	●	●	●	●	●	●	●
Advanced Temperature Management	●	●	●	●	●	●	●
NDIS driver							
RIL driver	●		●	●	●		
Multiplexer driver for Microsoft Windows	●	●	●	●	●		
Character framing	7E1 & 8E1	7E1 & 8E1	7E1 & 8E1	7E1 & 8E1	7E1 & 8E1	7E1 & 8E1	7E1 & 8E1
SIM 'Access Profile	●	●	●	●	●	●	●
Advanced Automotive features							
IMDS listed & GASDL compliant							
<b>Environmental regulations</b>							
RoHS compliant	●	●	●	●	●	●	●
WEEE compliant							



# Wireless Modules Overview

# CINTERION

Product Family	M2M Value			M2M Advanced			
	MC55i	BG2	BGS2	HC28/HC28-J	HC25	EU3	PH8
Product	GPRS	GPRS		HSDPA	HSDPA	HSPA+	Tracking
							
Frequency Range	Quad-Band GSM/GPRS	Dual-Band (BG2-E) Quad-Band (BG2-W) GSM/GPRS	Dual-Band (BGS2-E) Quad-Band (BGS2-W) GSM/GPRS	Tri-B. 3G (HC28) Dual-B. 3G (HC28-J) Quad-B. 2G (HC28) Dual-B. 2G(HC28-J)	Tri-Band 3G Quad-Band 2G	Dual-Band/ Tri-Band 3G Dual-Band 2G	Five-Band 3G Quad-Band 2G
Embedded processing							
GPS				•	•		•
Dimensions	35x32.5x2.95mm	26.7x31.0x3.0mm	27.6x18.8x2.7mm	33.9x50x4.5mm	33.9x50x4.5mm	33.9x44.6x5.0mm	50x33.9x3.1mm
Temperature Range	-40°C to +75°C	-40°C to +85	-30°C to +85°C	-30°C to +75°C	-30°C to +75°C	-40°C to +85°C	-40°C to +85°C
Voice	•	•	•	•	•	•	•
<b>Data Transmission</b>							
HSPA				HSDPA 3.6Mbps	HSDPA 3.6Mbps	HSDPA 3.6Mbps	HSDPA 14.4Mbps
UMTS				•	•	•	•
EDGE				Class 10	Class 10	Class 10	Class 12
GPRS	Class 10	Class 8/10	Class 8/10	Class 10	Class 10	Class 10	Class 12
CSD	•	•	•	•	•	•	•
SMS	•	•	•	•	•	•	•
Fax	•	•	•	•	•	•	•
TCP/IP connectivity	•	•	•			•	
<b>Interfaces</b>							
Antenna Connector	U.FL-R-SMT	Integrated	via LGA pad	2xU.FL-R-SMT	2xU.FL-R-SMT	U.FL-R-SMT	U.FL-R-SMT
Antenna Solder Pad	•		via LGA pad	•	•	•	•
Board-to-Board Connector	50-pin	60-pin		50-pin	50-pin	80-pin	80-pin
Surface mounting			LGA				
Multi SIM interface	•	•	•	•	•	•	•
Audio analog/digital	2x/1x	1x/-	1x/-	1x/-	1x/-	1x/1x	1x/1x
Serial interfaces	2x	2x	2x	1x	1x	1x	1x
USB				•	•	•	•
I2C bus		•					
SPI bus							
ADC/DAC		1x/1x	1x/1x			1x/-	
Multiple GPIO's (digital)		10	10			10	
<b>Approvals</b>							
R&TTE, GCF	•	•	•	•	•	•	•
US approvals (FCC, UL, IC, PTCRB)	•	• (BG2-W)	• (BGS2-W)	• (HC28)	•		
Japanese approvals (Jate, Telec)				•			
CE	•	•	•	•	•	•	•
Local operator certifications	•	•	•	•	•	•	•
e-mark							
<b>Special features</b>							
Over-the-air update							
RLS-Monitor (Jamming Detection)						•	
Advanced Temperature Management	•			•	•	•	•
NDIS driver				•	•		•
RIL driver	•		•	•	•		•
Multiplexer driver for Microsoft Windows	•		•	•	•	•	•
Character framing							
SIM 'Access Profile							
Advanced Automotive features							
IMDS listed & GASDL compliant							
<b>Environmental regulations</b>							
RoHS compliant	•	•	•	•	•	•	
WEEE compliant							

Product Family	Automotive Products		Terminals			M2M Pro	M2M Basic
Product	AGS3	AC75i/AC65i	TC65T	MC52iT	MC55iT	MC88/MC88i	MC66
	GPRS	EDGE	JAVA Terminal	Terminal	Terminal		Tracking
							
Frequency Range	Quad-Band GSM/GPRS	Quad-Band GSM/GPRS/EDGE	Quad-Band GSM/GPRS	Dual-Band GSM/GPRS	Quad-Band GSM/GPRS		Dual-Band (MC66W) Quad-Band (MC66E) GSM/GPRS
Embedded processing		JavaTM (AC65i)	JavaTM			JavaTM	
GPS							
Dimensions	33.9x29.6x3.2mm	33.9x45x4mm	90x130x39mm	65x74x33mm	65x74x33mm	65x74x33mm	65x74x33mm
Temperature Range	-40°C to +85°C	-40°C to +85°C	-30°C to +75°C	-30°C to +75°C	-30°C to +75°C	-30°C to +75°C	-30°C to +75°C
Voice	●	●	●	●	●		
<b>Data Transmission</b>							
HSDPA							
UMTS							
EDGE		Class 12 (AC75i)					
GPRS	Class 12	Class 12	Class 12	Class 8	Class 10	Class 12	Class 10/8
CSD	●	●	●	●	●	●	●
SMS	●	●	●	●	●	●	●
Fax	●	●	●	●	●	●	●
TCP/IP connectivity	●	●	●	●	●	●	●
<b>Interfaces</b>							
Antenna Connector	via LGA pad	Rosenberger SMP	SMA	FME	FME	FME	FME
Antenna Solder Pad	via LGA pad						
Board-to-Board Connector		80-pin					
Surface mounting	LGA						
Multi SIM interface	●	●					
Audio analog/digital	2x/1x PCM	2x/1x PCM	handset interface	handset interface	handset interface		
Serial interfaces	2x	2x	9 pin sub-D	9 pin sub-D	9 pin sub-D	9 pin sub-D	9 pin sub-D
USB	●	●				● (MC88i)	
I2C bus	●	●	●				
SPI bus	●	●	●				
ADC/DAC		2x/1x	2x/1x				
Multiple GPIO's (digital)		●	●				
<b>Approvals</b>							
R&TTE, GCF	●	●	●	●	●	●	●
US approvals (FCC, UL, IC, PTCRB)	●	●	●		●	●	●
Japanese approvals (Jate, Telec)							
CE	●	●	●	●	●	●	●
Local operator certifications	●	●	●	●	●	●	●
e-mark	●	●	●	●	●	●	●
<b>Special features</b>							
Over-the-air update		●	●				●
RLS-Monitor (Jamming Detection)	●	●	●				●
Advanced Temperature Management	●	●	●	●	●	●	●
NDIS driver							
RIL driver		● (AC75i)					●
Multiplexer driver for Microsoft Windows	●	● (AC75i)		●	●	●	●
Character framing	7E1 & 8E1	7E1 & 8E1	7E1 & 8E1				7E1 & 8E1
SIM 'Access Profile	●	●					●
Advanced Automotive features	●	●					
IMDS listed & GASDL compliant	●	●					
<b>Environmental regulations</b>							
RoHS compliant	●	●	●	●	●	●	●
WEEE compliant			●	●	●	●	

# NOTICE CINTERION PH8 / AH6

## CINTERION PH8

**Quadband 2G - Fiveband 3G - HSPA+ - GPRS Class 12 - EDGE Class 12 - GPS**

### Technical Data:

- GSM/GPRS/EDGE:** Quadband, 850/900/1800/1900MHz
- UMTS/HSPA+:** Fiveband, 800/850/AWS/1900/2100MHz
- GPRS multi-slot class 12
- EDGE multi-slot class 12
- GPS / A-GPS
- Input voltage range: 3,3 ... 4,2 V
- Operation temperature: -30 °C ... +85 °C
- Extended temperature range: -40°C ... +95°
- Dimensions: 50 x 33.9 x 3.1 mm, single sided
- HSDPA/HSUPA:** DL: 7.2 / 14.4 Mbps, UL: 2.0 / 5.76 Mbps
- EDGE:** DL/UL: max. 237 kbps, PBCCH support, Downlink/Uplink coding schemes – CS 1-4, MCS 1-9, Mobile Station Class B
- GPRS:** DL/UL: max. 85.6 kbps, Full PBCCH support, Mobile station class B, Coding scheme 1– 4
- Data:** CSD bis zu 14,4 kbit/s, V.110, RLP, non-transparent, 14.4kbps, USSD
- Voice:** HR, FR, EFR und AMR, Freihand-Betrieb, Echounterdrückung, Rauschunterdrückung, 9 Klingeltöne, TTY-Unterstützung
- SMS:** Point-to-point MT und MO, Cell broadcast, Text und PDU mode
- Interfaces:** 80-pin Board-to-Board Connector, Power supply, 2 antenna connections for GSM/UMTS, 1 antenna connector for GPS, Audio: 1x analog, 1x digital, USB 2.0 full speed, UICC/SIM/USIM 3V, 1.8V, serial interface up to 920 kbps, with autobauding up to 460 kbps, Not-Aus, Network status
- Special features:** NDIS/USB driver for Microsoft® Windows XP™, Windows Vista™ and Windows 7™, RIL/NDIS/USB drivers for devices based on Microsoft® Windows Mobile™ >= 6.X, USB driver for Microsoft® Windows CE™ 5.0 and 6.0, Multiplex driver for Microsoft® Windows XP™, Windows Vista™ and Windows 7™, customer IMEI / Netlock as a variant, firmware update via USB and serial interface, USB supports multiple composite modes and a CDC-ACM compliant mode for Linux



MC1213678

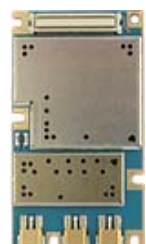
## NOTICE CINTERION AH6

### CINTERION AH6

**Premium performance HSPA+ Automotive Grade Module**

**Preliminary data - in development -**

- UMTS:** USA: Quad-Band (WCDMA/FDD) 850, 1900 MHz and AWS 1700/2100 MHz  
World: Four-Band (WCDMA/FDD) 800/850, 900 and 2100 MHz
- GSM:** Quad-Band 850, 900, 1800, 1900 MHz
- GPS / A-GPS
- RLS Monitor (Jamming Detection)
- Dimensions: 60 x 33.9 x 3.1 mm, single sided
- HSDPA/HSUPA:** DL: max. 14.4 Mbps, UL: max. 5.7 Mbps
- EDGE:** class 12, DL: max. 237 kbps, UL: max. 237 kbps
- GPRS:** class 12, DL: max. 85.6 kbps, UL: max. 85,6 kbps, full PBCCH support, EDA
- Voice:** HR, FR, EFR and AMR, supported handset, headset and hands-free mode
- Interfaces:** 80-pin Board-to-Board Connector, 2 Antenna connections for GSM/UMTS, 1 antenna connector for GPS, Audio: 1 x analog, 1 x digital, USB, USB 2.0 high speed, UICC/SIM card 3V, 1.8V, 2x serial interface - one with autobauding, 10x GPIO, Antenna diagnostics support for GSM / UMTS / GPS antennas



# CINTERION EES3/BGS3

## CINTERION EES3 / BGS3

LGA - Quadband - EDGE CLASS 12 (EES3) - GPRS Class 12 (EES3) / 10 (BGS3)

### Technical Data:

- Quadband GSM 850/900/1800/1900 MHz
- EDGE (E-GPRS) multi-slot class 12 (EES3)
- GPRS multi-slot class 12 (EES3)  
GPRS multi-slot class 10 (BGS3)
- TCP/IP stack access via AT commands
- Operation temperature: -30°C ... +75°C, Switch off: >+85°C
- Extended temperature range: +75°C ... +85°C, -30°C ... -40°C
- Supply voltage: 3,2... 4,5V
- Dimensions: 33,9 x 29,6 x 3,2 mm
- Weight: 5,5 g
- EDGE:** Max. 236,8 kbps (DL and UL), Modulation and coding schemes MCS 1-9
- GPRS:** Class 12: Max. 86 kbps (DL and UL), Coding schemes CS 1-4  
Class 10: Max. 86 kbps (DL) - 43 kbps (UL), Coding schemes CS 1-4
- Voice:** Triple-rate codec for HR, FR, and EFR, Adaptive multi-rate AMR, Hands-free operation, Echo cancellation & Noise reduction
- SMS**
- Fax:** Group 3, Class 1
- Interfaces:** 50 Ω antenna solder pad, Audio: 2 x analog, 1 x digital, 2 serial interfaces (ITU-T V.24 protocol), SIM card interface: 3 V, 1.8 V,  
**only EES3:** USB 2.0 full speed, I<sup>2</sup>C & SPI bus
- Special Features:** RLS Monitoring, Advanced Temperature Management
- Software:** RIL driver for Microsoft® Windows Mobile™ 6.1 based devices

### Features CINTERION LGA modules:

#### EES3 EDGE

- EDGE Class 12
- GPRS Class 12
- RIL driver for Microsoft® Windows Mobile™ 6.1

#### EGS5 Java™

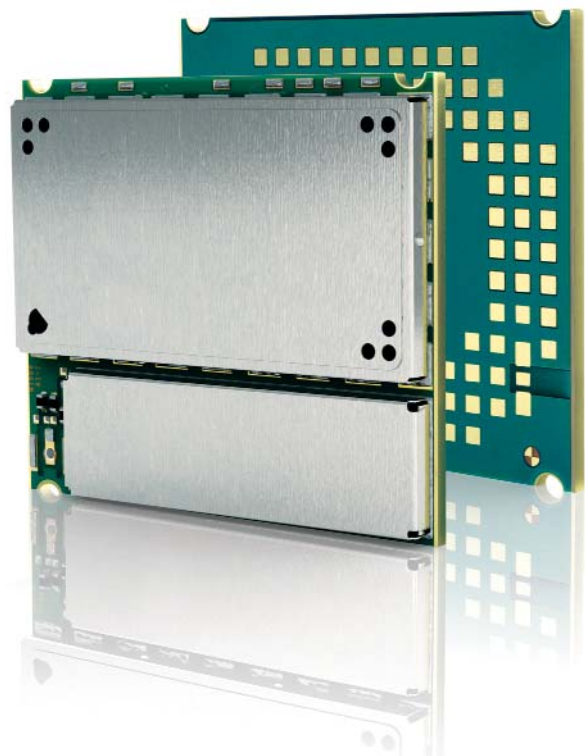
- GPRS Class 12
- JAVA™ based on a ARM9 processor
- additional industrial interfaces:  
SPI, I<sup>2</sup>C bus, USB, AD/DA converter, multiple GPIOs

#### EGS3 GPRS Advanced

- GPRS Class 12
- TCP/IP stack over AT
- additional industrial interfaces: SPI, I<sup>2</sup>C bus, USB

#### BGS3 GPRS Standard

- GPRS Class 10
- TCP/IP stack over AT
- RIL driver for Microsoft® Windows Mobile™ 6.1



# CINTERION EGS5/EGS3

## CINTERION EGS5 / EGS3

LGA - Quadband - JAVA™ (EGS5) - GPRS Class 12

### Technical Data:

- Quadband GSM 850/900/1800/1900 MHz
- GPRS multi-slot class 12
- TCP/IP stack access via AT commands
- Operation temperature: -30°C ... +75°C, Switch off: >+85°C
- Extended temperature range: +75°C ... +85°C, -30°C ... -40°C
- Supply voltage: 3,2... 4,5V
- Dimensions: 33,9 x 29,6 x 3,2 mm
- Weight: 5,5 g
- GPRS:** Class 12: Max. 86 kbps (DL and UL), Coding schemes CS 1-4
- Voice:** Triple-rate codec for HR, FR, and EFR, Adaptive multi-rate AMR, Hands-free operation, Echo cancellation & Noise reduction
- JAVA (only EGS5):** Java™ profile IMP-NG & CLDC 1.1 HI, Secure data transmission with HTTPS, SSL, and PKI, Multi-threading programming and program execution
- SMS**
- Fax:** Group 3, Class 1
- Interfaces:** 50 Ω antenna solder pad, Audio: 2 x analog, 1 x digital, 2 serial interfaces (ITU-T V.24 protocol), SIM card interface: 3 V, 1.8 V, **only EGS5/EGS3:** USB 2.0 full speed, I<sup>2</sup>C & SPI bus
- only EGS5:** Analog in and analog out (2 ADC and 1 PWM), Multiple GPIOs
- Special Features:** RLS Monitoring, Advanced Temperature Management

### Cinterion EES3, EGS5, EGS3, BGS3 and accessoires

#### Artikelbeschreibung

Artikelbeschreibung	Artikel-Nr.
Wireless module EES3	MC1213444
Wireless module EGS5	MC1213443
Wireless module EGS3	MC1213442
Wireless module BGS3	MC1213441
FME Built-in print connector	1072275
SMA Print-female, straight, THT, for antenna connection	1075096
SMA Print-female, angle, THT, for antenna connection	1070776
AMPHENOL chip card reader incl. holder	MC1213559-2
YAMAICHI SIM card reader (Push / Push, Standard Type with Switch)	MC1213610
MOLEX SIM card holder (Molex 91236-0001)	MC1213911
MOLEX SIM card reader (Molex 91228-3001)	MC1213912-2



1072275



1070776 / 1075096

# CINTERION BGS2 / AGS3

## CINTERION BGS2

**LGA - Dualband / Quadband - GPRS Class 8/10**

**Technical Data:**

- ❑ Dualband (BGS2-E): GSM 900/1800MHz  
Quadband (BGS2-W): GSM 850/900/1800/1900MHz
- ❑ GPRS multi-slot class 10 (BGS2-W) / 8 (BGS2-E)
- ❑ TCP/IP stack access via AT commands
- ❑ Input voltage range: 3,3 ... 4,5 V
- ❑ Operation temperature: -30 °C ... +85 °C
- ❑ Extended temperature range: -40°C ... -30°C, +85°C ... +90°C
- ❑ Dimensions: 27.6 x 18.8 x 2.7 mm
- ❑ Weight: 2,7g
- ❑ **GPRS:** PBCCH support, Mobile station class B, Coding scheme 1– 4
- ❑ **Data:** V.110, RLP, non-transparent, 2.4, 4.8, 9.6, 14.4kbps, USSD
- ❑ **Voice:** Triple-rate codec for HR, FR, and EFR, Adaptive multi-rate AMR  
Handsfree, Echo cancellation, noise reduction, 7 different ring tones
- ❑ **SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- ❑ **Fax:** Group 3, Class 1
- ❑ **Interfaces:** Power supply, 1x analog audio, 2 serial interfaces (ASC0, ASC1)  
SIM Card 3 V / 1.8 V, I10 GPIOs, 50 Ohm antenna pad



## CINTERION AGS3

**LGA - Quadband - GPRS Class 12 - extended temperature range**

**Technical Data:**

- ❑ Quadband GSM 850/900/1800/1900 MHz
- ❑ GPRS multi-slot class 12
- ❑ TCP/IP stack access via AT commands
- ❑ Input voltage range: 3,2 ... 4,5 V
- ❑ Operation temperature: -30°C ... +75°C
- ❑ Extended temperature range: +75°C ... +85°C, -30°C ... -40°C
- ❑ Dimensions: 33.9 x 29.6 x 3.2 mm
- ❑ Weight: 5,5 g
- ❑ **GPRS:** Class 12, PBCCH support, Mobile station class B, Coding scheme 1– 4
- ❑ **Data:** CSD up to 14,4 kbit/s, V.110, non-transparent mode, USSD support
- ❑ **Voice:** Triple-rate codec for HR, FR, and EFR, Adaptive multi-rate AMR  
Extended hands-free operation according to VDA Specification, echo cancellation, noise reduction, DTMF
- ❑ **SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- ❑ **Fax:** Group 3, Class 1
- ❑ **Interfaces:** Power supply, Audio: 2x analog, 1x PCM, 2 serial interfaces (ITU-T V.24 protocol, up to 921 kbps),  
USB 2.0 full speed, SIM Card 3 V / 1.8 V, I2C-Bus and SPI bus, 50 Ohm antenna pad
- ❑ **Special automotive features:** EU eCall prepared, SIM Access Profile integrated, extended temperature range,  
RLS monitoring, Measurement of module temperature, antenna diagnostics, emergency, even at high temperatures,  
IMDS listed & GASDL compatible, TS16949 and components, e-marking



AGS3 = MC1213445

# CINTERION AC65i/AC75i

## CINTERION AC75i / AC65i

**Quadband - EDGE CLASS 12 (AC75i) - JAVA™ (AC65i) - Extended temperature range**

**Technical Data:**

- ❑ Quadband GSM 850/900/1800/1900 MHz
- ❑ EDGE (E-GPRS) multi-slot class 12 (only AC75i)
- ❑ GPRS multi-slot class 12
- ❑ TCP/IP stack access via AT commands
- ❑ Supply voltage range: 3,3 ... 4,5 V
- ❑ Operation temperature: -40 °C ... +75 °C
- ❑ Extended temperature range: +75°C ... +85°C, -30°C ... -40°C
- ❑ Dimensions: 33.9 x 45 x 3.3 mm
- ❑ Weight: 8,5 g
- ❑ **EDGE:** Class 12, max. 236.8 kbps (DL & UL), Mobile station class B, Modulation and coding scheme MCS 1-9
- ❑ **GPRS:** Class 12, PBCCH support, Mobile station class B, Coding scheme 1– 4
- ❑ **Data:** CSD up to 14,4 kbit/s, V.110, non-transparent mode, USSD support
- ❑ **Voice:** Triple-rate codec for HR, FR, and EFR, Adaptive multi-rate AMR  
Enhanced hands-free operation according to VDA Specification for hands-free terminals, Version 1.5
- ❑ **JAVA (AC65i):** CLDC HotSpot™ Implementation 1.1.2, Java ME™ profile IMP-NG, Secure data transmission with HTTPS and PKI
- ❑ **Open application resources:** ARM® Core, Blackfin® DSP, Memory: 400 Kb (RAM), 1.7 Mb (Flash), Improved power-saving modes, On-device-debugging
- ❑ **SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- ❑ **Fax:** Group 3, Class 1
- ❑ **Interfaces:** 80-pin board-to-board connector, Rosenberger SMP 50 Ohm antenna connector, Power supply, Audio: 2x analog, 1x PCM, 2 serial interfaces (ITU-T V.24 protocol), USB 2.0 full speed, SIM Card 3 V / 1.8 V, I2C-Bus and SPI bus, GPIOs
- ❑ **Special automotive features:** SIM Access Profile integrated, Extended temperature range, Measurement of module temperature, Antenna diagnostic, Emergency call even at high temperature, IMDS listed & GASDL compliant, ISO/TS16949 development and manufacturing, RIL software for Microsoft® Windows Mobile™ 5.0 based devices, Multiplexer driver for Microsoft® Windows

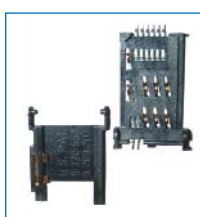


AC65i = MC1213879

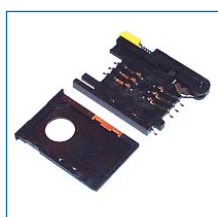
## Cinterion AC75i / AC65i and accessoires

**Article description**

Article description	Article-No.
Data module AC65i	MC1213879
Data module AC75i	MC1213878
Molex Board-to-Board Connector, 80pin., height 3.0 mm (Molex 53748-0808)	MC1213955
Molex Board-to-Board Connector, 80pin., height 4.0 mm (Molex 53916-0808)	MC1213956
ROSENBERGER SMP SMP cable - angle - female / RG174	MC1213586
ROSENBERGER SMP cable - female / RG174	MC1213587
SMP female (angle) - 25cm - FME - male (installation)	MC1213 Adapter 131
SMP female (angle) - 25cm - FME- cable - male	MC1213 Adapter 132
SMP female (angle) - 9,5cm - U.FL-V66F-male	MC1213 Adapter 250
AMPHENOL chipcard reader incl. holder	MC1213559-2
YAMAICHI SIM Card Reader (Push / Push, Standard Type with Switch)	MC1213610
MOLEX SIM Card Holder (Molex 91236-0001)	MC1213911
MOLEX SIM Card Reader (Molex 91228-3001)	MC1213912-2



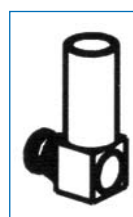
MC1213559-2



MC1213911  
MC1213912-2



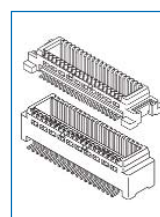
MC1213610



MC1213586



MC1213587



MC1213955  
MC1213956  
Fig. similar



MC1213 Adapter 131 (top)  
MC1213 Adapter 132 (middle)  
MC1213 Adapter 250 (bottom)

# CINTERION MC55i / TRIORAIL TRM3

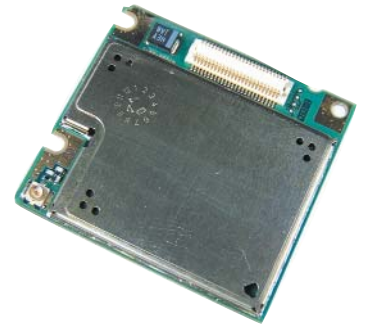
## CINTERION MC55i / TRIORAIL TRM:3

**MC55i: Data module for industrial applications**

**TRM:3: Data module for the GSM Railway network**

**Technical Data :**

- Quadband GSM 850/900/1800/1900 MHz (**MC55i**)  
Quadband GSM 900/1800/1900 MHz / GSM-R (**TRM:3**)
- GPRS multi-slot class 10
- TCP/IP stack access via AT commands
- Supply voltage range: 3,3 ... 4,8 V
- Operation temperature: -20°C ... +55°C (MC55i) / -20°C ... +70°C (TRM3)
- Extended temperature range: -40°C ... -20°C and +55°C ... +70°C
- Weight: 5,5 g
- GPRS:** max. 85.6 kbps (downlink), Mobile station class B, PBCCH support, Coding schemes CS 1-4
- Data:** CSD up to 14,4 kbps, USSD, non-transparent mode, V.110
- Voice:** Triple-rate codec for HR, FR, and EFR, Adaptive multi rate (AMR), Basic hands-free operation, Echo cancellation, Noise reduction
- SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- Fax:** Group 3, Class 2; **MC55i:** Group 3, Class 1+2
- Interfaces:** Hirose U.FL-R-SMT 50 Ohm Antenna connector, antenna connector, Antenna solder pad, Hirose 50-pin board-to-board connector: Power supply, Audio: 2 x analog, 1 x digital, SIM card interface 1.8 V / 3 V, 2 serial interfaces (ITU-T V.24 protocol), Battery charger
- Driver:** RIL/MUX software for Microsoft® Windows Mobile™ 5.0 based devices; **only MC55i:** RIL driver for Microsoft® Windows Mobile™ 6 based devices, Multiplex driver for Microsoft® Windows XP™ and Microsoft® Windows Vista™



MC55i = MC1213649

### Cinterion MC55i / Triorail TRM:3 and accessoires

Article Description	Article-No.
Data module MC55i	MC1213649
Data module TRM:3	MC1213649-TRM3
Hirose cable, U.FL-2LP-066-A (100) cable double-sided coated, 100 mm	MC1213588
Hirose cable, U.FL-2LP-066-A (100) cable double-sided coated, 200 mm	MC1213589
DF12C (3.0)-50DS-0.5V(80)/50 PIN Hirose Board to Board Connector	MC1213590
DF12E (3.0)-50DP-0.5V(80)/50 PIN Hirose Board to Board Connector, height 3mm	MC1213591
DF12E (5.0)-50DP-0.5V(80)/50 PIN Hirose Board to Board Connector, height 5mm	MC1213592
Hirose cable, U.FL-2LP(V)-04-A (100) cable double-sided coated, 100 mm	MC1213595
Hirose cable, U.FL-2LP(V)-04-A (100) cable double-sided coated, 200 mm	MC1213596
Hirose HF-connector, U.FL-R-SMT(10) HF connector for circuit board	MC1213599
Hirose U.FL-V04F-male - 10cm/20cm - FME mounting male	MC1213 Adapter 220/221
Hirose U.FL-V04F-male - 10cm/20cm - SMA mounting female	MC1213 Adapter 224/225
Hirose U.FL-088F-male - 10cm/20cm - FME mounting male	MC1213 Adapter 620/621
Hirose U.FL-088F-male - 10cm/20cm - SMA mounting female (also available in 8cm and 40cm)	MC1213 Adapter 624/625
AMPHENOL chipcard reader incl. holder	MC1213559-2
YAMAICHI SIM Card Reader (Push / Push, Standard Type with Switch)	MC1213610
MOLEX SIM Card Holder (Molex 91236-0001)	MC1213911
MOLEX SIM Card Reader (Molex 91228-3001)	MC1213912-2



MC1213 Adapter 220/224 (top)  
MC1213 Adapter 620/624 (bottom)



MC1213591



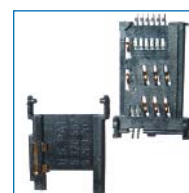
MC1213588  
MC1213589



MC1213595  
MC1213596



MC1213599



MC1213559-2



MC1213911  
MC1213912-2



## CINTERION BG2

**Dualband - GPRS Class 8 (BG2-E) / 10 (BG2-W)**

### Technical Data :

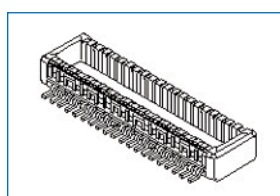
- Dualband (BG2-E): GSM 900/1800MHz  
Quadband (BG2-W): GSM 850/900/1800/1900MHz
- GPRS class 8 (BG2-E)  
GPRS class 10 (BG2-W)
- Control via AT commands
- Hayes 3GPP TS 27.007, TS 27.005
- SIM Application Toolkit
- TCP/IP stack access via AT commands
- Supply voltage range: 3,3 ... 4,5 V
- Operation temperature: -30°C ... +85°C
- Extended temperature range: -40°C ... -30°C and +85°C ... +90°C
- Dimensions: 26.7 x 31.0 x 3.0 mm
- Weight: 5 g
- GPRS:** Mobile station class B, PBCCH support, Coding schemes CS 1-4  
DL: max. 85.6 kbps, UL: max. 42.8 kbps (BG2-W) / UL: max. 21.4 kbps (BG2-E)
- CSD:** V.110, RLP, non-transparent, 2.4, 4.8, 9.6kbps, USSD
- Voice:** Triple-rate codec für HR, FR and EFR, AMR, hands-free operation, Echo cancellation, Noise reduction
- SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- Fax:** Group 3, Class 1
- Interfaces:** 60-pin Board-to-Board connector, integrated antenna connector, 2 serial interfaces (ASC0/ASC1), Automatic baud rate detection, Audio analog interface (Microphone & Speaker), UICC/SIM card interface 1.8 V and 3.0 V, 8 GPIO pins 1.8 V (special option for PWM or Buzzer and status indication functionality), 2 GPIO pins 2.8 V (optional usable as I2C), ADC/DAC (PWM) interface



BG2 -E = MC1213652  
BG2-W = MC1213653

### Cinterion BG2 and accessoires

Article Description	Article-No.
Data module BG2-E	MC1213652
Data module BG2-W	MC1213653
MOLEX 60pin B2B-Connector, hight 2,5 mm (Molex 53885-0608)	MC1213982
Murata HF connector	MC1213570
Murata HF cable 8 cm	MC1213571
Murata HF cable 20 cm	MC1213572
GSC connector 20cm FME mounting plug (Fig. top)	MC1213Adapter 044
GSC connector 10cm FME mounting plug (Fig. top)	MC1213Adapter 088
GSC socket 20cm FME mounting plug (Fig. bottom)	MC1213Adapter 076
SSMB-Nano mounting plug	1071937
AMPHENOL chipcard reader incl. holder	MC1213559-2
YAMAICHI SIM Card Reader (Push / Push, Standard Type with Switch)	MC1213610
MOLEX SIM Card Holder (Molex 91236-0001)	MC1213911
MOLEX SIM Card Reader (Molex 91228-3001)	MC1213912-2



MC1213958



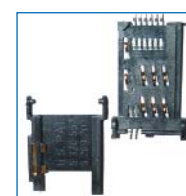
MC1213571  
MC1213572



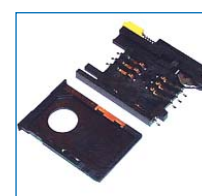
MC1213570



MC1213 Adapter 044/088  
MC1213 Adapter 076



MC1213559-2



MC1213911  
MC1213912-2

# CINTERION MC75i/TC63i/TC65i

## CINTERION MC75i / TC63i / TC65i

Quadband - GPRS Class 12 - EDGE (MC75i) - JAVA™ (TC65i) - optimized size

### Technical Data:

- ❑ Quadband GSM 850/900/1800/1900 MHz
- ❑ EDGE (E-GPRS) multi-slot class 12 (**only MC75i**)
- ❑ GPRS multi-slot class 12
- ❑ TCP/IP stack access via AT commands
- ❑ Supply voltage range: 3.2 ... 4.5 V
- ❑ Operation temperature: -30°C ... +65°C, Switch off: +80°C
- ❑ Extended temperature range: +65°C ... +75°C, -30°C ... -40°C
- ❑ Dimensions: 33,9 x 35 x 3,3 mm
- ❑ Weight: 7.5 g
- ❑ **EDGE (only MC75i):** max 236.8 kbps (DL & UL), Mobile station class B, Modulation and coding scheme MCS 1-9
- ❑ **GPRS:** max. 86 kbps (DL & UL), Full PBCCH support, mobile station class B, Coding scheme 1-4
- ❑ **Data:** CSD up to 14,4 kbps, V.110, Non-transparent mode, USSD support
- ❑ **Voice:** Triple-rate codec for HR, FR, and EFR, Adaptive multi-rate AMR, Basic hands-free operation, Echo cancellation, Noise reduction
- ❑ **JAVA (only TC65i):** CLDC 1.1HI, Java™ profile IMP-NG, secure data transmission with HTTPS, SSL and PKI
- ❑ **Open application resources:** ARM9® Core, Blackfin® DSP, Memory: 400 Kb (RAM), 1.7 Mb (Flash), Improved power-saving modes
- ❑ **SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- ❑ **Fax:** Group 3, Class 1
- ❑ **Interfaces:** Hirose U.FL-R-SMT 50 ohm antenna connector, antenna solder pad, Molex 80-pin board-to-board connector: Power supply, Audio: 2x analog/1x digital, 2 serial interfaces (ITU-T V.24 protocol), USB 2.0 full speed, SIM Card 3 V / 1.8 V, I²C bus, SPI bus
- ❑ **additional TC65:** 2 x analog in (ADC), 1 x analog out (PWM), Multiple GPIOs
- ❑ **Special features:** Multiplexer driver for Microsoft® Windows XP™ and Vista™, Character framing 7E1 and 8E1 at serial interface, Programmable module reset, SIM Access Profile integrated, RLS Monitor (Jamming Detection)
- ❑ **only MC75i:** RIL driver for Microsoft® Windows Mobile™ based devices, Multiplexer driver for Microsoft® Windows Mobile™

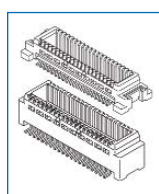


### Cinterion MC75i / TC63i / TC65i and accessoires

Article Description	Article-No.
Data module MC75i	MC1213675
Data module TC63i	MC1213672
Data module TC65i	MC1213673
Hirose cable, U.FL-2LP-066-A (100) cable double-sided coated, 100 mm	MC1213588
Hirose cable, U.FL-2LP-066-A (100) cable double-sided coated, 200 mm	MC1213589
Hirose cable, U.FL-2LP(V)-04-A (100) cable double-sided coated, 100 mm	MC1213595
Hirose cable, U.FL-2LP(V)-04-A (100) cable double-sided coated, 200 mm	MC1213596
Hirose HF-Connector, U.FL-R-SMT(10) HF connector for circuit board	MC1213599
Molex Board-to-Board Connector, 80pin., height 3.0 mm (Molex 53748-0808)	MC1213955
Molex Board-to-Board Connector, 80pin., height 4.0 mm (Molex 53916-0808)	MC1213956
Hirose U.FL-V04F-male - 10cm/20cm - FME mounting male	MC1213 Adapter 220/221
Hirose U.FL-V04F-male - 10cm/20cm - SMA mounting female	MC1213 Adapter 224/225
Hirose U.FL-088F-male - 10cm/20cm - FME mounting male	MC1213 Adapter 620/621
Hirose U.FL-088F-male - 10cm/20cm - SMA mounting female (also available in 8cm and 40cm)	MC1213 Adapter 624/625
AMPHENOL chipcard reader incl. holder	MC1213559-2
YAMAICHI SIM Card Reader (Push / Push, Standard Type with Switch)	MC1213610
MOLEX SIM Card Holder (Molex 91236-0001)	MC1213911
MOLEX SIM Card Reader (Molex 91228-3001)	MC1213912-2



MC1213 Adapter 220/224 (top)  
MC1213 Adapter 620/624 (bottom)



MC1213955  
MC1213956  
Fig. similar



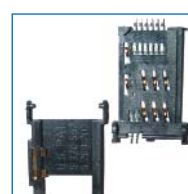
MC1213588  
MC1213589



MC1213595  
MC1213596



MC1213599



MC1213559-2



MC1213911  
MC1213912-2

# CINTERION XT65/XT75

## CINTERION XT75/XT65

**Quadband - GPRS Class 12 - EDGE class 10 (XT75) - JAVA™ - GPS**

### Technical Data:

- ❑ Quadband GSM850/900/1800/1900
- ❑ EDGE (E-GPRS) multi-slot class 10 (nur XT75)
- ❑ GPRS multi-slot class 12
- ❑ TCP/IP stack access via AT commands
- ❑ Supply voltage range: 3,3 ... 4,5 V
- ❑ Operation temperature: -30°C ... +85°C, Switch off: +90 °C
- ❑ Extended temperature range: -30°C ... +85°C
- ❑ Dimensions: 34 x 59 x 3,5 mm
- ❑ Weight: <10 g
- ❑ **EDGE:** max. 236.8 kbps (DL), Mobile station class B, Modulation and coding scheme MCS 1-9
- ❑ **GPRS:** max. 86 kbps (DL & UL), Mobile station class B, PBCCH support, Coding schemes CS 1-4
- ❑ **Data:** CSD up to 14,4 kbps, USSD, V.110, non-transparent mode
- ❑ **Voice:** Triple-rate codec for HR, FR, and EFR, Adaptive multi-rate AMR, hands-free operation, Echo cancellation, Noise reduction
- ❑ **JAVA:** CLDC 1.1 HI, J2ME™ profile IMP-NG, Location API (JSR179) for GPS access, Secure data transmission with HTTPS, SSL and PKI
- ❑ **Open application resources:** ARM® Core, Blackfin® DSP, Memory: 400 kB (RAM) and 1.2 MB (Flash), Improved power-saving modes, Support for integrated development environments with On-Device-Debugging
- ❑ **GPS receiver:** GPS dedicated AT commands, Support of SBAS (WAAS/EGNOS/MSAS), GPS active antenna supply: 3.0 V, A-GPS enabled, Tracking sensitivity: -158 dBm (with active antenna), Protocols: NMEA-0183 V2.3, RTCM, V2.2, UBX binary protocol
- ❑ **SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- ❑ **Fax:** Group 3, class 1
- ❑ **Interfaces:** 2 separated Hirose U.FL-R-SMT 50 Ohm antenna connectors for GPS and GSM, 2 antenna solder pads for GPS and GSM, Molex 80-pin board-to-board connector: Power supply, Audio: 2 x analog / 1 x digital, 1 serial interface (ITU-T V.24 protocol), USB 2.0 full speed, SIM card interface 3 V/1.8 V, I2C bus and SPI bus, 2x analog in (ADC), 1x analog out (PWM), Multiple GPIOs
- ❑ **Software:** RIL software for Microsoft® Windows Mobile™ 5.0 based devices



XT75 = MC1213881  
XT65 = MC1213882

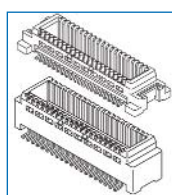
### Cinterion XT75 /XT65 and accessoires

#### Article Description

Article Description	Article-No.
Data module XT75	MC1213881
Data module XT65	MC1213882
Hirose cable, U.FL-2LP-066-A (100) cable double-sided coated, 100 mm	MC1213588
Hirose cable, U.FL-2LP-066-A (100) cable double-sided coated, 200 mm	MC1213589
Molex Board-to-Board Connector, 80pin., height 3.0 mm (Molex 53748-0808)	MC1213955
Molex Board-to-Board Connector, 80pin., height 4.0 mm (Molex 53916-0808)	MC1213956
Hirose cable, U.FL-2LP(V)-04-A (100) cable double-sided coated, 100 mm	MC1213595
Hirose cable, U.FL-2LP(V)-04-A (100) cable double-sided coated, 200 mm	MC1213596
Hirose HF-connector, U.FL-R-SMT(10) HF connector for circuit board	MC1213599
Hirose U.FL-V04F-male - 10cm/20cm - FME mounting male	MC1213 Adapter 220/221
Hirose U.FL-V04F-male - 10cm/20cm - SMA mounting female	MC1213 Adapter 224/225
Hirose U.FL-088F-male - 10cm/20cm - FME mounting male	MC1213 Adapter 620/621
Hirose U.FL-088F-male - 10cm/20cm - SMA mounting female (also available in 8cm and 40cm)	MC1213 Adapter 624/625
AMPHENOL chipcard reader incl. holder	MC1213559-2
YAMAICHI SIM Card Reader (Push / Push, Standard Type with Switch)	MC1213610
MOLEX SIM Card Holder (Molex 91236-0001)	MC1213911
MOLEX SIM Card Reader (Molex 91228-3001)	MC1213912-2



MC1213 Adapter 220/224 (top)  
MC1213 Adapter 620/624 (bottom)



MC1213955  
MC1213956



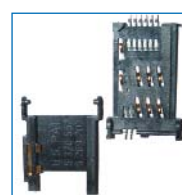
MC1213588  
MC1213589



MC1213595  
MC1213596



MC1213599



MC1213559-2



MC1213911  
MC1213912-2

# CINTERION HC25/HC28

## CINTERION HC25 / HC28

UMTS modules, whatever supports the HSDPA standard

### Technical Data:

- ❑ Triband UMTS/HSDPA 850/1900/2100 MHz  
Quadband GSM 850/900/1800/1900 MHz
- ❑ EDGE (E-GPRS) multi-slot class 10
- ❑ GPRS multi-slot class 10
- ❑ UMTS/HSDPA 3GPP release 5
- ❑ Supply voltage range: 3,2 ... 4,2 V
- ❑ Operation temperature: -30 °C ... +75 °C, Switch off: +85 °C
- ❑ Dimensions: 34 x 50 x 4,5 mm
- ❑ Weight: approx. 10 g
- ❑ **EDGE:** max. 236,8 kbps (DL), max. 118 kbps (UL), Mobile station class B, Modulation and coding scheme MCS 1-9
- ❑ **GPRS:** max. 85,6 kbps (DL), max. 42,8 kbps (UL), Full PBCCH support, mobile station class B, Coding scheme 1-4
- ❑ **GPS:** on-board GPS functionality (only HC25)
- ❑ **Data:** **HC25:** GSM data rate 14,4 kbps, V.110, UMTS data rate 57.6 kbps V.120, RLP (Non-transparent mode)  
**HC28:** GSM data rate 14.4 kbps, V.110, 3G UDI data rate 64 kbps, X.31, RLP (Non-transparent mode)
- ❑ **Voice:** Triple-rate codec for HR, FR and EFR, GSM & 3GPP: Adaptive multi-rate AMR, DTMF supported, CEPT/ANSI supervisory tones supported, Handset/Headset/Handsfree modes, TTY supported
- ❑ **UMTS:** max. 384 kbps (DL), max. 384 kbps (UL)
- ❑ **SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- ❑ **Fax:** Group 3, Class 1
- ❑ **Interfaces:** U.FL-R-SMT 50 ohm antenna connector, Antenna pad, Hirose 50-pin board-to-board connector: Power supply, Audio: 1 x analog, USB 2.0 full speed, UICC/SIM card 3 V, 1.8 V, Emergency-off; Network status;  
**only HC28:** ASC0
- ❑ **Special Features HC25:** Improved power-saving modes, NDIS/USB driver for Microsoft® Windows® XP RIL/NDIS/USB driver for Microsoft® Windows Mobile™5.0 based devices and higher  
**Special Features HC28:** NDIS/USB driver for Microsoft® Windows XP™ & Microsoft® Windows Vista™, RIL/NDIS/USB driver for Microsoft® Windows Mobile™6 based devices, Multiplex driver for Microsoft® Windows XP™ & Microsoft® Windows Vista™, USB driver for Microsoft® Windows CE™ 5.0  
SIM-Lock from SoftBank Mobile - the module will only produce for the japanese market



## Cinterion HC25 / HC28 and accessoires

Article Description	Article-No.
Data module HC25	MC1213825
Data module HC28	MC1213828-2
Hirose cable, U.FL-2LP-066-A (100) cable double-sided coated, 100 mm	MC1213588
Hirose cable, U.FL-2LP-066-A (100) cable double-sided coated, 200 mm	MC1213589
Hirose cable, U.FL-2LP(V)-04-A (100) cable double-sided coated, 100 mm	MC1213595
Hirose cable, U.FL-2LP(V)-04-A (100) cable double-sided coated, 200 mm	MC1213596
Hirose HF-connector, U.FL-R-SMT(10) HF connector for circuit board	MC1213599
DF12E (3.0)-50DP-0.5V(80)/50 PIN Hirose Board to Board Connector, height 3mm	MC1213591
DF12E (5.0)-50DP-0.5V(80)/50 PIN Hirose Board to Board Connector, height 5mm	MC1213592
Hirose U.FL-V04F-male - 10cm/20cm - FME mounting male	MC1213 Adapter 220/221
Hirose U.FL-V04F-male - 10cm/20cm - SMA mounting female	MC1213 Adapter 224/225
Hirose U.FL-088F-male - 10cm/20cm - FME mounting male	MC1213 Adapter 620/621
Hirose U.FL-088F-male - 10cm/20cm - SMA mounting female (also available in 8cm and 40cm)	MC1213 Adapter 624/625
AMPHENOL chipcard reader incl. holder	MC1213559-2
YAMAICHI SIM Card Reader (Push / Push, Standard Type with Switch)	MC1213610
MOLEX SIM Card Holder (Molex 91236-0001)	MC1213911
MOLEX SIM Card Reader (Molex 91228-3001)	MC1213912-2



MC1213 Adapter 220/224 (top)  
MC1213 Adapter 620/624 (bottom)



MC1213591



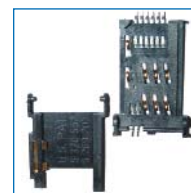
MC1213588  
MC1213589



MC1213595  
MC1213596



MC1213599



MC1213559-2



MC1213911  
MC1213912-2

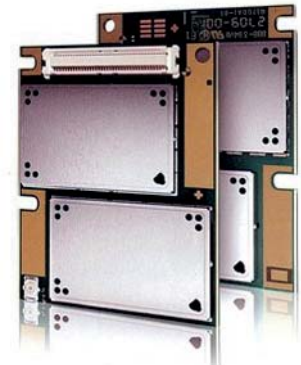
# CINTERION EU3

## CINTERION EU3

### UMTS & HSDPA wireless module

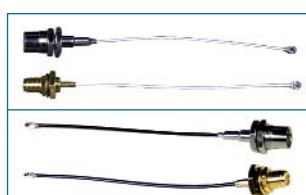
#### Technical Data:

- Dualband UMTS: 900 / 2100 MHz (EU3-E)  
Triband UMTS: 850 / 900 / 2100 MHz (EU3-P)
- Dual-Band GSM: 900 / 1800 MHz
- EDGE (E-GPRS) multi-slot class 10
- GPRS multi-slot class 10
- UMTS/HSDPA 3GPP release 5
- Supply voltage range: 3,2 ... 4,2 V
- Operation temperature: -30 °C ... +75 °C, Switch off: +85 °C
- Extended temperature range: -30°C ... -40°C and +85°C ... +90°C
- Dimensions: 33.9 x 44.6 x 5.0 mm
- Weight: ca. 11 g
- EDGE:** DL: max. 237 kbps, UL: max. 118 kbps
- GPRS:** DL: max. 85.6 kbps, UL: max. 42.8 kbps, Full PBCCH support
- HSDPA:** DL: max. 3.6 Mbps, UL: max: 384 kbps
- UMTS:** DL: max. 384 kbps, UL: max. 384 kbps
- Data:** CSD data transmission 14.4 kbps, V.110
- USSD support
- Voice:** Triple-rate codec for HR, FR, EFR and Adaptive multi-rate AMR, Handset/Headset/Handsfree modes
- SMS:** SMS cell broadcast, Text- and PDU-mode
- Fax:** Group 3, Class 1
- Interfaces:** U.FL-R-SMT 50 Ohm antenna connector, 80-pin board-to-board connector:  
power supply, Audio: 1 x analog, High speed serial interface (up to 460 kbps), USB 2.0 high speed interface (up to 480 Mbps), UICC/SIM card interface 3V, 1.8V, 10 GPIOs, ADC port
- Driver:** Multiplex driver 3GPP 27.010 for Microsoft® Windows XP™, Windows Vista™ and Windows 7™

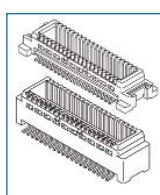


### Cinterion EU3 and accessoires

Article Description	Article-No.
Data module EU3-E	MC1213650
Data module EU3-P	MC1213651
Hirose cable, U.FL-2LP-066-A (100) cable double-sided coated, 100 mm	MC1213588
Hirose cable, U.FL-2LP-066-A (100) cable double-sided coated, 200 mm	MC1213589
Hirose cable, U.FL-2LP(V)-04-A (100) cable double-sided coated, 100 mm	MC1213595
Hirose cable, U.FL-2LP(V)-04-A (100) cable double-sided coated, 200 mm	MC1213596
Hirose HF-connector, U.FL-R-SMT(10) HF connector for circuit board	MC1213599
DF12E (3.0)-50DP-0.5V(80)/50 PIN Hirose Board to Board Connector, height 3mm	MC1213591
DF12E (5.0)-50DP-0.5V(80)/50 PIN Hirose Board to Board Connector, height 5mm	MC1213592
Hirose U.FL-V04F-male - 10cm/20cm - FME mounting male	MC1213 Adapter 220/221
Hirose U.FL-V04F-male - 10cm/20cm - SMA mounting female	MC1213 Adapter 224/225
Hirose U.FL-088F-male - 10cm/20cm - FME mounting male	MC1213 Adapter 620/621
Hirose U.FL-088F-male - 10cm/20cm - SMA mounting female (also available in 8cm and 40cm)	MC1213 Adapter 624/625
AMPHENOL chipcard reader incl. holder	MC1213559-2
YAMAICHI SIM Card Reader (Push / Push, Standard Type with Switch)	MC1213610
MOLEX SIM Card Holder (Molex 91236-0001)	MC1213911
MOLEX SIM Card Reader (Molex 91228-3001)	MC1213912-2



MC1213 Adapter 220/224 (oben)  
MC1213 Adapter 620/624 (unten)



MC1213955  
MC1213956  
Abb. ähnlich



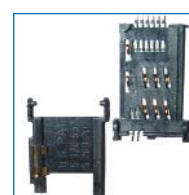
MC1213588  
MC1213589



MC1213595  
MC1213596



MC1213599



MC1213559-2



MC1213911  
MC1213912-2

# CINTERION MC52i Terminal / MC55i Terminal

## CINTERION MC55i Terminal / MC52i Terminal

### Quadband (MC55i) - GPRS Class 10/8 (MC55i/MC52i)

#### Technical Data:

- Dualband GSM 900/1800 MHz (MC52i)  
Quadband GSM 850/900/1800/1900 MHz (MC55i)
- GPRS multi-slot class 10/8
- Control via AT commands
- Supply voltage range: 8 ... 30 V
- Operation temperature: -20°C ... +65°C
- Extended temperature range: -30°C ... -20°C and +65°C ... +75°C
- Dimensions: 65 x 74 x 33 mm
- Weight: 110 g
- GPRS:** DL: max. 85.6 kbps, UL: max. 42.8 kbps (MC55iT) / 21.4 kbps (MC52iT),  
Mobile Station Class B
- Data:** CSD up to 14.4 kbps, USSD, non-transparent mode, V.110
- Voice:** Triple-rate codec for HR, FR and EFR, Basic hands-free operation,  
Echo cancellation, Noise reduction
- SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- Fax:** Group 3, Class 1, 2
- Interfaces:** Antenna connector FME FME (male), Power supply, Handset, SIM card reader, V.24/V.28 D-Sub



MC55i Terminal = MC1213775-TERMINAL  
MC52i Terminal = MC1213772-TERMINAL

### Cinterion MC55i Terminal/MC52i Terminal and accessoires

#### Article Description

#### Article-No.

MC55i Terminal	MC1213775-Terminal
MC52i Terminal	MC1213772-Terminal
Power supply incl. connecting cable / Western plug	MC1213114-X
Power adapter Western Plug / open end, approx. 1,5m	MC1213115
12-24V Car adapter 1,5m cable, Western plug, for battery pack	MC1213116
Microphone Western plug	MC1213117
Handset	MC1213225
Data cable 1,8m, 9 pin male - 9 pin female - also available in 0,5, 1, 3 and 5m	MC1213226
Battery pack 100% cutoff incl. cable 0,2 m Western plug (RJ10) / Western plug (RJ12)	MC1213150
Mounting Kit incl. 2 fixing bolts	Mounting Kit TC/MC



MC1213114-X



MC1213115



MC1213116



MC1213117



MC1213150



MC1213225



MC1213226



Mounting Kit TC/MC

# CINTERION TC65 JAVA Terminal

## CINTERION TC65 JAVA Terminal

**Quadband - GPRS Class 12 - JAVA™**

**Technical Data:**

- ❑ Quadband GSM 850/900/1800/1900 MHz
- ❑ GPRS multi-slot class 12
- ❑ TCP/IP stack access via AT commands
- ❑ Supply voltage range: 8 ... 30 V
- ❑ Operation temperature: -30°C ... +65°C, Switch off: +80 °C
- ❑ Dimensions: 90 x 130 x 38 mm
- ❑ Weight: 190 g
- ❑ **GPRS:** max. 86 kbps (DL & UL), Mobile station class B, PBCCH support, Coding schemes CS 1-4
- ❑ **Data:** CSD up to 14.4 kbps, USSD, V.110, non-transparent mode
- ❑ **Voice:** Triple-rate codec for HR, FR, and EFR, Adaptive multi-rate AMR, Basic hands-free operation, Echo cancellation, Noise reduction
- ❑ **JAVA:** CLDC 1.1 HI, J2ME™ profile IMP-NG, secure data transmission with HTTPS and PKI
- ❑ **Open application resources:** ARM® Core, Blackfin® DSP, Memory: 400 KB (RAM) and 1.7 MB (Flash) Improved power-saving modes
- ❑ **SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- ❑ **Fax:** Group 3, Class 1
- ❑ **Interfaces:** SMA 50 Ohm antenna connector, 24 pin Micro-N-Lok connector: I2C bus and SPI bus, 2 x analog in (ADC) VDD (2.9 V), Multiple GPIOs, 9-pin sub-D for serial interface (ITU-T V.24 protocol), ON/OFF button, SIM Card 3 V, 1.8 V, power supply, Handset audio interface



MC1213873-Terminal

## Cinterion TC65 JAVA Terminal and accessoires

**Article Description**

**Article-No.**

TC65 JAVA Terminal	MC1213873-Terminal
Power supply incl. connecting cable / Western plug, EU plug	MC1213114-45-EU
Power supply incl. connecting cable / Western plug, UK plug	MC1213114-45-UK
Power supply incl. connecting cable / Western plug, US plug	MC1213114-45-US
Power adapter Western Plug / open end, approx. 1,5m	MC1213115
12-24V Car adapter 1,5 m cable, Western plug, for battery pack	MC1213116
Microphone, Western Plug	MC1213117
Handset	MC1213225
Data cable 1,8m, 9 pin male - 9 pin female	MC1213226
Battery pack 100% cutoff incl. cable 0,2m Western plug (RJ10) / Western plug (RJ12)	MC1213150
System plug 300mm, 24 pin, completely manufactures	MC1213873-Cablecom
Cable 300mm AWG22-red, manufactures	MC1213873-Cable300
Socket contact 24pos, Micro MNL, Receptacle Housing	MC1213873-Housing
Crimping contact for Housing	MC1213873-Contact
Mounting-Kit	Mounting Kit TC65T



MC1213114-45-EU-/UK-/US



MC1213115



MC1213116



MC1213117



MC1213150



MC1213225



MC1213226



Mounting-Kit TC65T



- < MC1213873-Cablecom (top left)
- < MC1213873-Cable300 (bottom left)
- < MC1213873-Housing (top right)
- < MC1213873-Contact (bottom right)

# MC Technologies MC80 Terminal

## MC80 Terminal - Made by MC Technologies

Quad-band multi-functional terminal for many M2M applications with JAVA programmable signaling LEDs



### Technical Data:

- Quadband GSM 850/900/1800/1900 MHz
- GPRS multi-slot class 12
- SIM Application Tool Kit
- TCP/IP stack access via AT commands
- Input voltage range: 12 V in conjunction with our MC1213114-45-EU Power Supply
- Operation temperature: -30°C ... +75°C, Switch off: >+85°C
- Extended temperature range: +75°C ... +85°C, -30°C ... -40°C
- Dimensions: 65 x 74 x 33 mm
- Weight: approx. 110 g
- GPRS:** max. 86 kbps (DL & UL), Mobile station class B, PBCCH support, Coding schemes CS 1-4
- Data:** CSD up to 14.4 kbps, Mobile station class B, PBCCH support, Coding schemes CS 1-4
- JAVA:** Java™ profile IMP-NG & CLDC 1.1 HI, secure data transmission with HTTPS, SSL, and PKI, Multithreading programming and program execution
- SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- Fax:** Group 3, Class 1
- Interfaces:** Power supply, SIM card reader, FME antenna connector (male), RS232 (V.24/V.28 on sub-D)
- Special Features:** **WatchDog and always on function**  
**6 freely programmable LEDs signaling in JAVA**

available Q3-Q4/2011

### MC Technologies MC80 Terminal and Accessoires

Article Description	Article No.
MC80 Terminal - Made by MC Technologies -	MC1213880-Terminal
Power supply incl. connecting cable / Western plug, EU plug	MC1213114-45-EU
Power supply incl. connecting cable / Western plug, UK plug	MC1213114-45-UK
Power supply incl. connecting cable / Western plug, US plug	MC1213114-45-US
Power adapter Western Plug / open end, approx. 1,5m	MC1213115
12-24V Car adapter 1,5 m cable, Western plug, for battery pack	MC1213116
Data cable 1,8m, 9 pin male - 9 pin female	MC1213226
Battery pack 100% cutoff incl. cable 0,2 m Western plug (RJ10) / Western plug (RJ12)	MC1213150
Mounting Kit incl. 2 fixing bolts	Mounting Kit TC/MC



MC1213114-45-EU/-UK/-US



MC1213115



MC1213116



MC1213226



Mounting Kit TC/MC



# MC Technologies MC88/MC88i Terminal

## MC88/MC88i Terminal - Made by MC Technologies

**Quadband multi-functional terminal for varied applications, with advanced functions for all basic M2M solutions with JAVA, GPRS and TCP / IP**



### Technical Data:

- Quadband GSM 850/900/1800/1900 MHz
- GPRS multi-slot class 12
- TCP/IP stack access via AT commands
- SIM Application Tool Kit
- Input voltage range: 8 ... 30 V
- Operations temperature: -30°C ... +75°C, Switch off: >+85°C
- Extended temperature range: +75°C ... +85°C, -30°C ... -40°C
- Dimensions: 65 x 74 x 33 mm
- Weight: approx. 110 g
- GPRS:** max. 86 kbps (DL & UL), Mobile station class B, PBCCH support, Coding schemes CS 1-4
- Data:** CSD up to 14.4 kbps, Mobile station class B, PBCCH support, Coding schemes CS 1-4
- JAVA:** Java™ profile IMP-NG & CLDC 1.1 HI, secure data transmission with HTTPS, SSL, and PKI, Multithreading programming and program execution
- SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- Fax:** Group 3, Class 1
- Interfaces:** Power supply, SIM card reader, FME antenna connector (male), RS232 (V.24/V.28 on sub-D)
- MC88i Terminal:** additional Mini-USB interface
- Special Features:** WatchDog and always on functions

## MC Technologies MC88 / MC88i Terminal and Accessoires

Article Description	Article No.
MC88 Terminal - Made by MC Technologies -	MC1213888-Terminal
MC88i Terminal - Made by MC Technologies -	MC1213888-USB-232
Power supply incl. connecting cable / Western plug, EU plug	MC1213114-45-EU
Power supply incl. connecting cable / Western plug, UK plug	MC1213114-45-UK
Power supply incl. connecting cable / Western plug, US plug	MC1213114-45-US
Power adapter Western Plug / open end, approx. 1,5m	MC1213115
12-24V Car adapter 1,5 m cable, Western plug, for battery pack	MC1213116
Data cable 1,8m, 9 pin male - 9 pin female	MC1213226
Mini USB 2.0 cable, 1,8m	MC1213230
Battery pack 100% cutoff incl. cable 0,2 m Western plug (RJ10) / Western plug (RJ12)	MC1213150
Mounting Kit incl. 2 fixing bolts	Mounting Kit TC/MC



MC1213114-45-EU-/UK-/US



MC1213116



MC1213226



MC1213230



Mounting Kit TC/MC

# MC Technologies MC66 Terminal

## MC66 Terminal - Made by MC Technologies

**GSM/GPRS-Terminal for all basic M2M solutions**

**Technical Data:**

- Dualband GSM 900/1800MHz (MC66-E)  
Quadband GSM 850/900/1800/1900 MHz (MC66-W)
- GPRS multi-slot class 10 (MC66-W)
- GPRS multi-slot class 8 (MC66-E)
- TCP/IP stack access via AT commands
- Input voltage range: 8 ... 30 V
- Operation temperature: -30°C ... +85°C
- Extended temperature range: -40°C ... -30°C und +85°C ... +90°C
- Dimensions: 65 x 74 x 33 mm
- Weight: approx. 110 g
- GPRS:** DL: max. 85.6 kbps / UL: max. 42.8 kbps (MC66-W), UL: max. 21.4 kbps (MC66-E),  
Mobile station class B, PBCCH support, Coding schemes CS 1-4
- Data:** CSD up to 14.4 kbps, V.110, Non-transparent mode, USSD support
- SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- Fax:** Group 3, Class 1
- Interfaces:** Power supply, SIM card reader, FME antenna connector (male), RS232 (V.24/V.28 on sub-D)



## MC Technologies MC66-E/MC66-W Terminal and accessoires

Article Description	Article No.
MC66-E Terminal - Made by MC Technologies -	MC1213652-Terminal
MC66-W Terminal - Made by MC Technologies -	MC1213653-Terminal
Power supply incl. connecting cable / Western plug, EU plug	MC1213114-45-EU
Power supply incl. connecting cable / Western plug, UK plug	MC1213114-45-UK
Power supply incl. connecting cable / Western plug, US plug	MC1213114-45-US
Power adapter Western Plug / open end, approx. 1,5m	MC1213115
12-24V Car adapter 1,5 m cable, Western plug, for battery pack	MC1213116
Data cable 1,8m, 9 pin male - 9 pin female	MC1213226
Battery pack 100% cutoff incl. cable 0,2 m Western plug (RJ10) / Western plug (RJ12)	MC1213150
Mounting Kit incl. 2 fixing bolts	Mounting Kit TC/MC



MC1213114-45-EU/-UK/-US



MC1213115



MC1213116



MC1213226



Mounting Kit TC/MC

# MC Technologies MC55i/TRM3 Terminal

## MC55i/TRM3 Terminal - Made by MC Technologies

### Technical Data:

- ❑ Quadband GSM 850/900/1800/1900 MHz (**MC55i/MC66-W**)  
Quadband GSM 900/1800/1900 MHz / GSM-R (**TRM3**)
- ❑ GPRS multi-slot class 10
- ❑ TCP/IP stack access via AT commands
- ❑ Supply voltage range: 8 ... 30 V
- ❑ Operation temperature: -20°C ... +55°C (MC55i) / -20°C ... +70°C (TRM3)
- ❑ Extended temperature range: -40°C ... -20°C und +55°C ... +70°C
- ❑ Dimensions: 65 x 74 x 33 mm
- ❑ Weight: approx. 110 g
- ❑ **GPRS:** DL: max. 85.6 kbps, Mobile station class B, PBCCH support, Coding schemes CS 1-4
- ❑ **Data:** CSD up to 14.4 kbps, V.110, Non-transparent mode, USSD support
- ❑ **Voice:** Half rate (HR) / Full rate (FR) / Enhanced full rate (EFR), Adaptive multi rate (AMR), Basic hands-free operation, Echo cancellation, Noise reduction
- ❑ **SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- ❑ **Fax:** Group 3, Class 1/2
- ❑ **Interfaces:** Power supply, Handset, SIM Card Reader, FME antenna connector (male), RS232 (V.24/V.28 on sub-D)
- ❑ **Driver:** RIL/MUX software for Microsoft® Windows Mobile™ 5.0 based devices; **only MC55i:** RIL driver for Microsoft® Windows Mobile™ 6 based devices, Multiplex driver for Microsoft® Windows XP™ and Microsoft® Windows Vista™



### MC Technologies MC55i/TRM3 Terminal and accessoires

Article Description	Article-No.
MC55i Terminal - Made by MC Technologies -	MC1213649-Terminal
TRM3 Terminal - Made by MC Technologies -	MC1213649-R
Power supply incl. connecting cable / Western plug, EU plug	MC1213114-45-EU
Power supply incl. connecting cable / Western plug, UK plug	MC1213114-45-UK
Power supply incl. connecting cable / Western plug, US plug	MC1213114-45-US
Power adapter Western Plug / open end, approx. 1,5m	MC1213115
12-24V Car adapter 1,5 m cable, Western plug, for battery pack	MC1213116
Microphone, Western Plug	MC1213117
Handset	MC1213225
Data cable 1,8m, 9 pin male - 9 pin female	MC1213226
Battery pack 100% cutoff incl. cable 0,2 m Western plug (RJ10) / Western plug (RJ12)	MC1213150
Mounting Kit incl. 2 fixing bolts	Mounting Kit TC/MC



MC1213114-45-EU/-UK/-US



MC1213115



MC1213116



MC1213117



MC1213225



MC1213226

# MC Technologies AC75i/AC65i/MC75i/TC63i/TC65i Terminal

## AC75i/AC65i/MC75i/TC63i/TC65i Terminal - Made by MC Technologies

### Technical Data:

- Quadband GSM 850/900/1800/1900 MHz
- EDGE (E-GPRS) multi-slot class 12 (**AC75i/MC75i**)
- GPRS multi-slot class 12
- TCP/IP stack access via AT commands
- Input voltage range: 8 ... 30 V
- Operations temperature: -30°C ... +65°C / **AC75i/AC65i** = -30°C ... +75°C
- Extended temperature range: +65°C ... +75°C, -30°C ... -40°C  
**AC75i/AC65i** = +75°C ... +85°C, -30°C ... -40°C
- Dimensions: 65 x 74 x 33 mm
- Weight: approx. 110 g
- EDGE:** max. 236.8 kbps (DL & UL), Mobile station class B, Modulation und coding scheme MCS 1-9
- GPRS:** max. 86 kbps (DL & UL), Mobile station class B, PBCCH support, Coding schemes CS 1-4
- Data:** CSD up to 14.4 kbps, V.110, Non-transparent mode, USSD support
- Voice (optional):** Triple-rate codec für HR, FR and EFR, Adaptive multi rate (AMR), Basic hands-free operation, echo cancellation, noise reduction
- JAVA (AC65i/TC65i):** secure data transmission with HTTPS and PKI  
**AC65i:** CLDC HotSpot™ Implementation 1.1.2CLDC, Java ME™ profile IMP-NG,  
**TC65i:** CLDC 1.1 HI, J2ME profile IMP-NG
- SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- Fax:** Group 3, Class 2
- Schnittstellen:** Power Supply, Handset, SIM card reader, FME antenna connection (male), RS232 (V.24/V.28 on sub-D)
- USB-Terminal:** additional Mini-USB interface
- Optional:** RS232 and RS485 interface or with GPIO adapter (**only TC65i**)
- Special Features:** Autostart function, WatchDog function (**only AC65i/TC65i**)



Back RS485-Terminal

### MC Technologies AC75i/AC65i/MC75i/TC63i/TC65i Terminal and accessoires

#### Article Descriptin

- AC75i Terminal - Made by MC Technologies -
- AC75i Terminal mit Audio-Erweiterung - Made by MC Technologies -
- AC65i Terminal - Made by MC Technologies -
- MC75i Terminal - Made by MC Technologies -
- MC75i USB-Terminal - Made by MC Technologies -
- TC63i Terminal - Made by MC Technologies -
- TC63i USB-Terminal - Made by MC Technologies -
- TC65i JavaTerminal - Made by MC Technologies -
- TC65i USB-Terminal - Made by MC Technologies -
- TC65i RS485-Terminal - Made by MC Technologies -
- TC65i GPIO-Terminal - Made by MC Technologies -
- Power supply incl. connecting cable / Western plug, EU plug
- Power supply incl. connecting cable / Western plug, UK plug
- Power supply incl. connecting cable / Western plug, US plug
- Power adapter Western Plug / open end, approx. 1,5m
- 12-24V Car adapter 1,5 m cable, Western plug, for battery pack
- Data cable 1,8m, 9 pin male - 9 pin female
- Battery pack 100% cutoff incl. cable 0,2 m Western plug (RJ10) / Western plug (RJ12)
- Mounting Kit incl. 2 fixing bolts

#### Article No.

- MC1213878-Terminal
- MC1213878-Term-Audio
- MC1213879-Terminal
- MC1213675-Terminal
- MC1213675-USB-232
- MC1213672-Terminal
- MC1213672-USB-232
- MC1213673-Terminal
- MC1213673-USB-232
- MC1213673-485-Term
- MC1213673-T-GPIO
- MC1213114-45-EU
- MC1213114-45-UK
- MC1213114-45-US
- MC1213115
- MC1213116
- MC1213226
- MC1213150
- Mounting Kit TC/MC



MC1213114-45-EU-/UK-/US



MC1213115



MC1213116



MC1213150



Mounting Kit TC/MC

# MC Technologies HC25 Terminal

## HC25 Terminal - Made by MC Technologies

**UMTS Terminal, whatever supports the HSDPA standard**

### Technical Data:

- ❑ Triband UMTS/HSDPA (WCDMA/FDD) 850/1900/2100 MHz  
Quadband GSM 850/900/1800/1900 MHz
- ❑ EDGE (E-GPRS) multi-slot class 10
- ❑ GPRS multi-slot class 10
- ❑ UMTS/HSDPA/GSM 3GPP
- ❑ TCP/IP stack access via AT commands
- ❑ Supply voltage range: 8 ... 30 V
- ❑ Operation temperature: -30 °C ... +65 °C, Switch off: +85°C
- ❑ Dimensions: 65 x 74 x 33 mm, Weight: 130 g
- ❑ **EDGE:** max. 237 kbps (DL), max. 118 kbps (UL),  
Modulation and coding scheme MCS 1-9, mobile station class B
- ❑ **GPRS:** max. 85.6 kbps (DL), max. 42.8 kbps (UL) Full PBCCH support,  
mobile station class B, Coding scheme 1-4
- ❑ **UMTS:** max. 384 kbps (DL), max. 384 kbps (UL)
- ❑ **HSDPA:** max. 3.6 Mbps (DL), max. 384 kbps (UL), UE CAT [1-6], 11, 12 supported,  
Compressed mode according to 3GPP TS25.212
- ❑ **GPS:** on-board GPS functionality
- ❑ **Data:** GSM data rate 14.4 kbps, V.110; UMTS data rate 57.6 kbps V.120;  
RLP (Non-transparent mode)
- ❑ **SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- ❑ **Fax:** Group 3, Class 1
- ❑ **Interfaces:** RS232, USB, Power supply, SIM Card Reader, FME antenna connector (male)
- ❑ **Optional:** GPS-Terminal with 2 x antenna connector (FME male / SMA female)
- ❑ **Special Features:** Improved power-saving modes, NDIS/USB driver for Microsoft®  
Windows® XP, RIL/NDIS/USB driver for devices based on Microsoft® Windows  
Mobile™ 5.0 and higher



HC25 GPS-Terminal

## MC Technologies HC25 Terminal and accessoires

### Article Description

HC25 Terminal USB - Made by MC Technologies -  
 HC25 GPS-Terminal USB - Made by MC Technologies -  
 Power supply incl. connecting cable / Western plug, EU plug  
 Power supply incl. connecting cable / Western plug, UK plug  
 Power supply incl. connecting cable / Western plug, US plug  
 Power adapter Western Plug / open end, approx. 1,5m  
 12-24V Car adapter 1,5 m cable, Western plug, for battery pack  
 Data cable 1,8m, 9 pin male - 9 pin female  
 USB cable A/B, 1m  
 USB cable A/B, 2m  
 Battery pack 100% cutoff incl. cable 0,2 m Western plug (RJ10) / Western plug (RJ12)  
 Mounting Kit incl. 2 fixing bolts

### Article-No.

MC1213825-Terminal  
 MC1213825-Term-GPS  
 MC1213114-45-EU  
 MC1213114-45-UK  
 MC1213114-45-US  
 MC1213115  
 MC1213116  
 MC1213226  
 MC1213229-1  
 MC1213229-2  
 MC1213150  
 Mounting Kit TC/MC



MC1213115



MC1213116



MC1213226



MC1213229-1/-2



Mounting Kit TC/MC

# MC Technologies PH8 Terminal

## PH8 Terminal - Made by MC Technologies

### HSPA+/UMTS/EDGE/GPS Terminal

#### Technical Data:

- ❑ Fiveband UMTS (WCDMA/FDD): 800, 850, 1900, AWS and 2100 MHz
- ❑ Quad-Band GSM: 850, 900, 1800, 1900 MHz
- ❑ EDGE (E-GPRS) multi-slot class 12
- ❑ GPRS multi-slot class 12
- ❑ UMTS / HSPA+, 3GPP release 6 / 7
- ❑ GSM / GPRS / EDGE, 3GPP release 99 / 4
- ❑ TCP/IP stack access via AT commands
- ❑ Input voltage range: 8 ... 30 V
- ❑ Operation temperature:-30 °C ... +85 °C
- ❑ Extended temperature range: -40°C ... +95°
- ❑ Dimensions: 65 x 74 x 33 mm
- ❑ Weight: approx. 110 g
- ❑ **HSDPA/HSUPA:** DL: 7.2 / 14.4 Mbps, UL: 2.0 / 5.76 Mbps
- ❑ **EDGE:** DL/UL: max. 237 kbps, PBCCH support, Downlink/Uplink coding schemes – CS 1-4, MCS 1-9, Mobile Station Class B
- ❑ **GPRS:** DL/UL: max. 85.6 kbps, Full PBCCH support, Mobile station class B, Coding scheme 1– 4
- ❑ **UMTS:** DL/UL: max. 384 kbps
- ❑ **GPS:** on-board GPS function
- ❑ **Data:** CSD up to 14,4 kbps, USSD, V.110, non-transparent mode, RLP
- ❑ **SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- ❑ **Interfaces:** Power supply, SIM card reader, antenna connector FME (male) for GSM and SMA (female) for GPS, RS232 (V.24/V.28 on D-Sub), Mini-USB



available Q3-Q4/2011

### MC Technologies PH8 Terminal and accessoires

Article Description	Article-No.
PH8 Terminal - Made by MC Technologies -	MC1213678-TERM-GPS
Power supply incl. connecting cable / Western plug, EU plug	MC1213114-45-EU
Power supply incl. connecting cable / Western plug, UK plug	MC1213114-45-UK
Power supply incl. connecting cable / Western plug, US plug	MC1213114-45-US
Power adapter Western Plug / open end, approx. 1,5m	MC1213115
12-24V Car adapter 1,5 m cable, Western plug, for battery pack	MC1213116
Data cable 1,8m, 9 pin male - 9 pin female	MC1213226
Mini USB 2.0 cable, 1,8m	MC1213230
Battery pack 100% cutoff incl. cable 0,2 m Western plug (RJ10) / Western plug (RJ12)	MC1213150
Mounting Kit incl. 2 fixing bolts	Mounting Kit TC/MC



MC1213115



MC1213116



MC1213226



MC1213229-1/-2



Mounting Kit TC/MC

# MC Technologies XT75/XT65 Terminal

## XT75/XT65 Terminal - Made by MC Technologies

### Technical Data:

- Quadband GSM850/900/1800/1900
- EDGE (E-GPRS) multi-slot class 10 (**only XT75**)
- GPRS multi-slot class 12
- TCP/IP stack access via AT commands
- Supply voltage range: 8 ... 30 V
- Operation temperature: -30°C ... +65°C, Switch off: +90°C
- Extended temperature range: -30 °C ... +85 °C
- Dimensions: 65 x 74 x 33 mm
- Weight: approx. 110 g
- EDGE (only XT75):** max. 236.8 kbps, Mobile station class B, Modulation and coding scheme MCS 1-9
- GPRS:** max. 86 kbps (DL&UL), Mobile station class B, PBCCH support, Coding schemes CS 1-4
- Data:** CSD up to 14,4 kbps, USSD, V.110, non-transparent mode
- JAVA:** CLDC 1.1 HI, J2ME™ profile IMP-NG, Location API (JSR179) for GPS access, secure data transmission with HTTPS, SSL and PKI
- Open application resources:** ARM® Core, Blackfin® DSP, Memory: 400 kB (RAM) und 1.2 MB (Flash), Support for integrated development environments with On-Device-Debugging
- GPS receiver:** GPS dedicated AT commands, Support for SBAS (WAAS/EGNOS/MSAS), GPS active antenna supply: 3.0 V, A-GPS enabled, Protocols: NMEA-0183 V2.3, RTCM, V2.2, UBX binary protocol
- SMS:** Point-to-Point MO and MT, SMS cell broadcast, Text- and PDU-mode
- Fax:** Group 3, Class 1
- Interfaces:** Power supply, SIM Card Reader, antenna connector FME (male) for GSM and SMA (female) for GPS, RS232 (V.24/V.28 on D-Sub)
- USB-Terminal:** Additional Mini-USB interface
- Special Features:** Autostart function, WatchDog function



Back USB-Terminal

## MC Technologies XT75 / XT65 Terminal and accessoires

### Article Description

Article Description	Article-No.
XT75 Terminal - Made by MC Technologies -	MC1213881-Terminal
XT65 Terminal - Made by MC Technologies -	MC1213882-Terminal
XT75 USB-Terminal - Made by MC Technologies -	MC1213881-USB-232
XT65 USB-Terminal - Made by MC Technologies -	MC1213882-USB-232
Power supply incl. connecting cable / Western plug, EU plug	MC1213114-45-EU
Power supply incl. connecting cable / Western plug, UK plug	MC1213114-45-UK
Power supply incl. connecting cable / Western plug, US plug	MC1213114-45-US
Power adapter Western Plug / open end, approx. 1,5m	MC1213115
12-24V Car adapter 1,5 m cable, Western plug, for battery pack	MC1213116
Data cable 1,8m, 9 pin male - 9 pin female	MC1213226
Mini USB 2.0 cable, 1,8m	MC1213230
Battery pack 100% cutoff incl. cable 0,2 m Western plug (RJ10) / Western plug (RJ12)	MC1213150
Mounting Kit incl. 2 fixing bolts	Mounting Kit TC/MC



MC1213115



MC1213226



MC1213230



MC1213150



Mounting Kit TC/MC

# MC Technologies PCI-Card / GPIO-Adapter

## PCI Card - Made by MC Technologies

### GSM/GPRS Terminal for the PCI bus

PCI card for office and industrial PC with PCI bus.

„Low profile“ optional available.

Available with Cinterion AC75i/AC65i/MC75i/TC63i/TC65i

#### Technical data:

- Quadband GSM 850/900/1800/1900 MHz
- EDGE** (E-GPRS) multi-slot class 10 (**AC75i/MC75i**)
- GPRS multi-slot class 12
- TCP/IP stack access via AT commands
- Operation temperature:
  - 30 °C ... +85 °C = AC75i/AC65i
  - 30 °C ... +75 °C = MC75i/TC63i/TC65i
- Specifications for data transmission:**
  - EDGE:** max 236.8 kbps, Modulation and coding scheme MCS 1-9, mobile station class B
  - GPRS:** Full PBCCH support, mobile station class B, Coding schemes CS 1-4
  - CSD:** up to 14,4 kbps, USSD, V.110, non-transparent mode
- JAVA (AC75/TC65/TC65i):** CLDC 1.1HI, J2ME profile IMP-NG, Secure data transmissio with HTTPS and PKI
- Open application resources:** ARM® Core, Blackfin® DSP, Memory: 400 Kb (RAM), 1.7 Mb (Flash), Improved power-saving modes



AC75i PCI Card = MC 12 13 876-PCI-Card  
 AC65i PCI Card = MC 12 13 875-PCI-Card  
 MC75i PCI Card = MC 12 13 675-PCI-Card  
 TC63i PCI Card = MC 12 13 672-PCI-Card  
 TC65i PCI Card = MC 12 13 673-PCI-Card

## PH8 PCI-Card - Made by MC Technologies

The PH8 PCI card offers the perfect solution for the challenging long-term requirements of industrial applications.

#### Features:

- UMTS/HSDPA: Fiveband UMTS (WCDMA/FDD): 800, 850, 1900, AWS and 210
- Quadband GSM: 850, 900, 1800, 1900 MHz
- GPRS Multislot Class 12
- EDGE Multislot Class 12
- HSDPA/HSUPA: DL: 7.2 / 14.4 Mbps, UL: 2.0 / 5.76 Mbps
- UMTS: 384 kbps DL & UL



## GPIO-Adapter - Made by MC Technologies

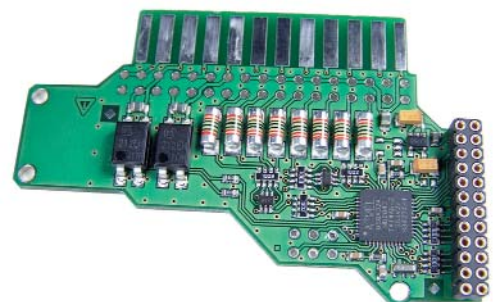
### GPIO-ADAPTER for the MC-CUT component

The GPIO-Adapter is an additional extension component with different entrances and exits for the GMS/GPRS terminals based on the MC-CUT component. It can also be integrated in GPS terminals.

The MC-CUT and the GPIO component can be controlled via the serial interface as well as via diverse JAVA applications.

The MC-CUT GPIO ADAPTER is available with up to 8 inputs or 2 outputs with 6 inputs. The following variants are possible:

- MC-CUT-GPIO-8i0o
- MC-CUT-GPIO-7i1o
- MC-CUT-GPIO-6i2o





# MC Technologies PC104 Card

## PC104 Card - Made by MC Technologies

### GSM/GPRS Terminal for PC104 Systems

GSM/GPRS Terminal for embedded systems with PC104 bus, simply, quickly and economically

Available with Cinterion MC75i/TC63i/TC65i/MC55i/TRM3

#### Technical data:

- ❑ Quadband GSM 850/900/1800/1900 MHz (MC75i/TC63i/TC65i/MC55i)  
Quadband GSM-R / EGSM 900 / GSM 1800 / GSM 1900 (TRM3)
  - ❑ EDGE (E-GPRS) multi-slot class 10 (nur MC75i)
  - ❑ GPRS multi-slot class 12 (MC75i/TC63i/TC65i)  
GPRS multi-slot class 10 (MC55i/TRM3)
  - ❑ TCP/IP stack access via AT commands
  - ❑ Operation temperature: -40°C bis +75°C (MC75i/TC63i/TC65i)  
-40°C bis +70°C (MC55i/TRM3)
  - ❑ **Specifications for data transmission:**  
EDGE: max 236,8 kbps, Modulation und coding scheme MCS 1-9, mobile station class B  
GPRS: Full PBCCH support, mobile station class B, Coding schemes CS 1-4  
CSD: bis zu 14,4 kbps, USSD, V.110, non-transparent mode
  - ❑ JAVA (only TC65i): CLDC 1.1HI, J2ME profile IMP-NG, secure data transmission with HTTPS and PKI
- Open application resources:** ARM® Core, Blackfin® DSP, Memory: 400 Kb (RAM), 1.7 Mb (Flash), Improved power-saving modes



PC104-MC75i = MC1213675-PC104  
 PC104-TC63i = MC1213672-PC104  
 PC104-TC65i = MC1213673-PC104  
 PC104-MC55i = MC1213649-PC104  
 PC104-TRM3 = MC1213649-PC104-R

#### Supported GSM services::

- ❑ Data, Fax, SMS, GPRS

#### Supported interfaces:

- ❑ COM 1 to COM 12

#### Supported interrupts:

- ❑ IRQ3, IRQ4, IRQ5, IRQ6, IRQ7, IRQ9, IRQ10, IRQ11, IRQ12, IRQ14 IRQ15
- ❑ also Shared-Interrupt

#### Execution:

- ❑ Standard PC104 bus

## Example of a customer application (study)

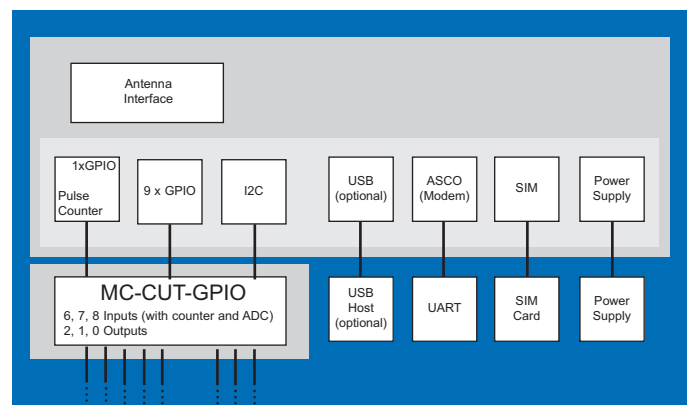
PC104 Card  
 with 2 x MC75 for routing systems  
 as double GSM interface board



Study



The GPIO Terminal is available with Cinterion modules EGS5, TC65i, XT65 and XT75



Overview MC-CUT-GPIO with MC-CUT Terminal

# MC Technologies TM Terminal

## TM terminal - Made by MC Technologies

**GSM/GPRS Terminal (without case) for industrial applications**

**Available with Cinterion AC75i, AC65i, MC75i, TC65i, TC63i, XT75, XT65, MC55i and GSM-R module TRM3**

### Technical data:

- Quadband GSM 850/900/1800/1900 MHz  
Quadband GSM-R / GSM 900/1800/1900 MHz (nur TRM3)
- TCP/IP stack access via AT commands
- Operation temperature:   -40°C ... +85°C (AC75i/AC65i)  
  -30°C ... +85°C (XT75/XT65)  
  -30°C ... +75°C (MC75i/TC63i/TC65i)  
  -30°C ... +70°C (MC55i/TRM3)
- EDGE** (E-GPRS) multi-slot class 10 (**only AC75i/MC75i/XT75**):  
max 236.8 kbps, Mobile station class B, Modulation and coding scheme MCS 1-9
- GPRS** Class 12 / Class 10 (only MC55i/TRM3)  
PBCCH support, Mobile station class B, Coding scheme 1- 4
- JAVA** (**only AC65i/TC65i/XT75/XT65**): CLDC 1.1HI, J2ME profile IMP-NG,  
secure data transmission with HTTPS and PKI

**Special Features:** Autostarting Function, Watchdog Function

### Interfaces:

- Voltage supply (8 V to 30 V)
- In and disconnecting contacts (floating or active signal inputs)
- Integrated SIM-Card-Reader (push/push)
- Sub-D-9 (female): serial interface ASC0 (fully occupied; RS-232 compatibly; Format: 8N1 to 230400 bps)
- 2 line pinboard in the screen line dimension of 2.54 mm:
  - second serial interface ASC1 (part-equipped: RXD, TXD, CTS, RTS; 3 v-logic; Format: 8N1 to 230400 bps)
  - sending and receipt line of the first serial interface for simple 2 wire interfaces (RXD, TXD; RS-232 compatibly; Format: 8N1 to 230400 bps)
  - similar to audio interface to the first shot of up to two microphones and two loudspeakers and similar to GROUND VDD MICP1 MICN1 EPP1 EPN1

### Short description:

Hardware module for the integration directly on printed circuit boards or wired to the main application



## MC Technologies TM terminals and accessoires

Article Description	Article-No.
AC75iTM	MC1213878-TM
AC65iTM	MC1213879-TM
MC75iTM	MC1213675-TM
TC63iTM	MC1213672-TM
TC65iTM	MC1213673-TM
XT75TM	MC1213881-TM
XT65TM	MC1213882-TM
MC55iTM	MC1213649-TM

### Accessoires for MC55iTM

Power supply for battery pack incl. cable / Barrel connectors	MC1213111
Power cable Microfit 50cm, open end	MC1213123
Data cable 9pol. male / 9pol. female	MC1213226
Screw clamps 4-pin	MC1213847-TM-X4SKL
Vertical connectors 14-pin	MC1213847-TM-X6PS
Vertical connectors 4-pin	MC1213847-TM-X4PS
HF solder crimp for direct connection RG174/U	MC1213847-TM-HFLC
SMA Print (female) straight, THT, for antenna connection	1075096
SMA Print (female) angle, THT, for antenna connection	1070776
Screws M2 x 4mm	MC1213832
Distance bolt 15mm	MC1213833



# MC Technologies SMC 2 / RP5-GSM Car Booster

## SMC 2 - Made by MC Technologies

**Smart modem controller 2, pluggable controller for all usual Cinterion / MC Technologies data modules:**

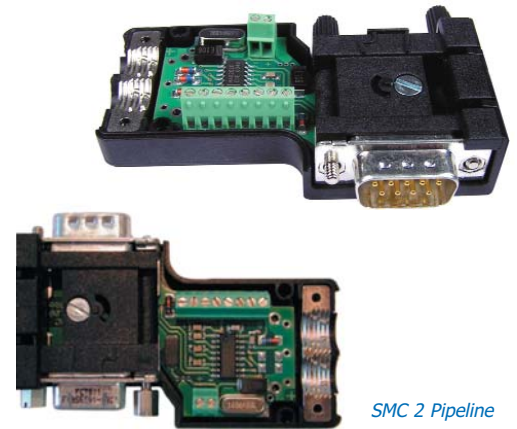
The easiest way of SMS notification !

### Version 4xIN:

Small, smart and intelligent - with 4 input ports for transmitting the status of reports and signals via SMS (freely programmable) to up to 4 receivers. Simply plug on to the data modem - that`s it.

### Version 2xIN/2xOUT:

Also available as version with 2 input and 2 output ports. They switch the contacts by SMS. As SMC-4i0o, however with two input ports and two open-drain output ports for controlling two machines via SMS.



SMC 2 Pipeline

## SMC 2 Pipeline

Economical expansion of already existing systems (also of the SMC2 by further input/output ports).

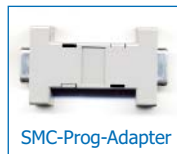
The SMC2P is simply plugged in between the Cinterion / MC Technologies data module and the already existing system.



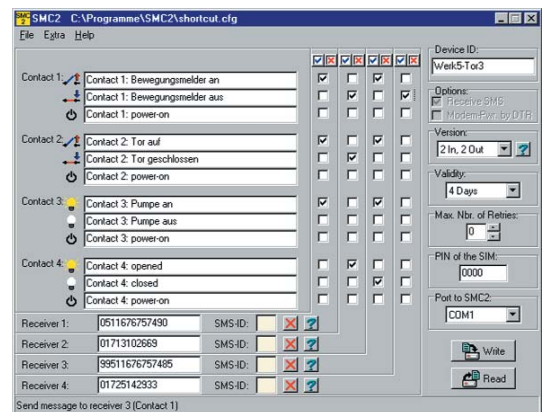
MC1213114-1



MC1213115-3



SMC-Prog-Adapter



## MC Technologies Smart Modem Controller and accessoires

### Article Description

- SMC2 4 inputs (4xIN)
- SMC2 2 inputs / outputs (2xIN, 2xOUT)
- SMC2 Pipeline 2 inputs (2xIN)
- Programming adapter for TC35iT / TC35iTM / MC35iT / MC35iTM
- Power supply for SMC
- Power cable for SMC

### Article-No.

- SMC2
- SMC-2I/2O
- SMC2-Pipeline
- SMC-Prog-Adapter
- MC1213114-1
- MC1213115-3

## RP5-GSM Full Duplex Car Booster

### Specifications::

- Frequency:: 890 - 915 MHz (TX); 935 - 960 MHz (RX)
- RX / TX Gain: RX: 20 dB; TX: 20 dB
- RF Output power: 3 Watts
- Power Consumption: DC 12V, 1A
- RF I/O Connector: FME-male / FME-male, 50 Ohm
- Fuse: 3A
- Dimensions: 14.0 x 18.8 x 3.5 cm
- Weight: 550 g
- Scope of delivery: 1 x PR5 Car Booster
  - 1 x 1,5m coaxial cable (RG-58U)
  - 1 x 3,5m coaxial cable (RG-58U)
  - 1 x Plug-in charger

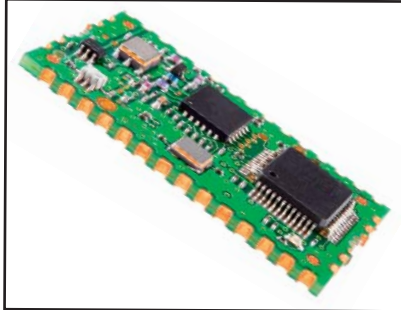
**NOTE: Export equipment without German permission!**



# Adeunis RF

# Wireless Modules

## TWIMO



All our modules (HP, MP, LP) are available in two versions:

- ❑ «ready-to-use» version including an Adeunis-RF application. This version is a default configured radio gateway.
- ❑ «programmable» version through the 16kB available memory of the micro-controller. Accessible API library for an optimal radio configuration.
- ❑ These TWIMO modules, with their adherence to the Form Factor, unique footprint, identical I/Os, powerful STM32 ARM Cortex-M3 microcontroller and huge API libraries, large power range (from 10 to 500mW), huge choice of licence free frequencies, UART and RF output adjustment and numerous supported protocols, provide optimal radio functionality, whilst guaranteeing the portability of ADEUNIS RF clients' applications.

The range comes in 3 strengths:

- ❑ TWIMO HP 868 – High Power, Transmit power 500mW – range up to 6000m
- ❑ TWIMO MP 868 & 434 – Mid Power, Transmit power 50mW – range up to 1000m
- ❑ TWIMO LP 868 & 434 – Low Power, Transmit power 10mW – range up to 300m

## WIRELESS MODULES (RF and Bluetooth)

Produkt Name	TWIMO HP868 Ready-To-Use	TWIMO HP868 Programmierbar	TWIMO MP868 Ready-To-Use	TWIMO MP868 Programmierbar	ARF54 868MHz Ready-To-Use	ARS4 915MHz Ready-To-Use	ARF44 Ready-To-Use	ARF32 Ready-To-Use	ARF52 Ready-To-Use	ARF52 U.F.L Ready-To-Use
Herstellernummer	ARF7581AA	ARF7736xx	ARF7580AA	ARF7735xx	ARF7429A	ARF7429B	ARF7419A	ARF7044A	ARF7455A	ARF7455B
Max. Reichweite mit der Standardantenne	6km	6km	1km	1km	6km	6km	300m	20m	100m	100m
Frequenzbereich	869,5Mhz	869,5Mhz	863-870Mhz	863-870Mhz	869,5Mhz	902/928Mhz	863-870Mhz	2,4Ghz	2,4Ghz	2,4Ghz
HF-Ausgangsleistung	500mW (27dBm)	500mW (27dBm)	50mW (17dBm)	50mW (17dBm)	500mW (27dBm)	500mW (27dBm)	8mW(9dBm)	1mW	100mW(20dBm)	100mW(20dBm)
HF-Empfindlichkeit	-110dBm	-110dBm	-110dBm	-110dBm	-112dBm	-112dBm	-103(dBm)	-85dBm	-87dBm	-87dBm
Microcontroller	-	IAR (STM32 ARM Cortex M3)	-	IAR (STM32 ARM Cortex M3)	-	-	-	-	-	-
Abmessungen (L/B/H)	16x32x4mm	16x32x4mm	16x32x4mm	16x32x4mm	42x20x4mm	42x20x4mm	27x24x6	25x18x3,5	33x18x6	33x18x6
Betriebstemperatur	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C
<b>DATENÜBERTRAGUNG</b>										
Modulation	GFSK	GFSK	GFSK	GFSK	FSK	FSK	FSK	-	-	-
HF-Datenrate	10/38.4/57.6kbps	10/38.4/57.6kbps	10/38.4/57.6kbps	10/38.4/57.6kbps	max 57.6kbps	max 57.6kbps	max 19.2kbps	max 723kbps	max 3Mbps	max 3Mbps
Serielle Datenrate	10/38.4/57.6kbps	10/38.4/57.6kbps	10/38.4/57.6kbps	10/38.4/57.6kbps	max 57.6kbps	max 57.6kbps	max 19.2kbps	max 921.6kbps	max 921.6kbps	max 921.6kbps
Anzahl der Frequenzkanäle	1	1	14	14	1	1	14	-	-	-
<b>STROMAUFNAHME</b>										
Schlaf Modus	20µA	20µA	20µA	20µA	-	-	<3µA	-	6mA	6mA
Empfangen	18mA	18mA	18mA	18mA	35mA	35mA	23mA	40mA	40mA	40mA
Senden	600mA (@27dBm)	600mA (@27dBm)	130mA (@17dBm)	130mA (@17dBm)	700mA	700mA	36mA	40mA	50mA/300mA	50mA/300mA
Versorgungsspannung	3.3V (3.0V to 3.6V)	3.3V (3.0V to 3.6V)	3.3V (3.0V to 3.6V)	3.3V (3.0V to 3.6V)	3.3V (3.0V to 3.6V)	3.3V (3.0V to 3.6V)	3.3V (2.85V to 3.6V)	3.3V (2.85V to 3.6V)	3.3V (2.85V to 3.6V)	3.3V (2.85V to 3.6V)
<b>SCHNITTSTELLEN</b>										
Integrierte Antenne	*	*	*	*	*	*	*	*	*	*
RF-Pin-Antenne	-	-	-	-	-	-	-	-	-	-
Antennenanschluß	-	-	-	-	-	-	-	-	-	U.F.L
UART	3	3	3	3	1	1	1	1	1	1
I2C	1	1	1	1	-	-	-	-	-	-
SPI	2	2	2	2	-	-	-	-	-	-
AD/DA Wandler	4	4	4	4	-	-	-	-	-	-
<b>SONDERFUNKTIONEN</b>										
Asynchron (Transparent)	*	*	*	*	*	*	*	*	*	*
Synchron (TDMA)	*	*	*	*	*	*	*	*	*	*
Adressierter Modus	*	*	*	*	*	*	*	*	*	*
Repeater	*	*	*	*	*	*	*	*	*	*
SPP Profil	-	-	-	-	-	-	-	*	*	*
DUN Profil (Modem)	-	-	-	-	-	-	-	*	*	*
Sonstiges	-	Embedded ARM Cortex M3 Programmierbar durch User	-	Embedded ARM Cortex M3 Programmierbar durch User	-	-	Low COST	-	-	-

## WIRELESS MODULES (ready-to-use)

Produkt Name	ARF73 Lizenz HF Modem	ARF53 PRO HF Modem	ARF43 PRO HF Modem	ARF33 PRO HF Modem	ARF50 IO Modul	ARF50 PRO IO Modul	ARF18 Empfänger	ARF18 Fernbedienung	ARF62 Bluetooth Dongle	ARF45 PRO Serial to Wi-Fi Gateway
Herstellernummer	ARF7499Ax	ARF77xx	ARF77xx	ARF77xx	-	-	-	-	-	-
Max. Reichweite mit der Standardantenne	25km	6km	1km	200m	Modem dependent	Modem dependent	300m	300m	100m	200m
Frequenzbereich	410/470Mhz	869,5Mhz	863-870Mhz	863-870Mhz	-	-	868-870Mhz	863-870Mhz	2,4Ghz	2,4Ghz
HF-Ausgangsleistung	up to 4W (33dBm)	500mW (27dBm)	50mW (17dBm)	10mW (10dBm)	-	-	-	1mW	100mW(20dBm)	32mW(15dBm)
HF-Empfindlichkeit	-115dBm	-112dBm	-110dBm	-110dBm	-	-	-103(dBm)	-	-87dBm	-82dBm
Abmessungen (L/B/H)	169x100x55mm	145x100x40mm	145x100x40mm	145x100x40mm	105x91x60mm	105x91x60mm	145x100x40mm	-	-	145x100x40mm
Betriebstemperatur	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C
Gehäuseschutzklasse	IP65	IP65	IP65	IP65	IP20	IP20	IP20	IP20	IP20	IP65
<b>DATENÜBERTRAGUNG</b>										
Modulation	GMSK	FSK	FSK	FSK	Modem dependent	Modem dependent	-	-	-	-
HF-Datenrate	max 9.6kbps	max 57.6kbps	max 57.6kbps	max 57.6kbps	Modem dependent	Modem dependent	-	-	max 3Mbps	max 54Mbps
Serielle Datenrate	max 9.6kbps	max 57.6kbps	max 57.6kbps	max 57.6kbps	9.6kbps / 57.6kbps	9.6kbps / 57.6kbps	-	-	max 921.6kbps	max 230kbps
Anzahl der Frequenzkanäle	-	1	14	14	-	-	-	-	-	-
<b>ANTENNE</b>										
Integrierte Antenne	*	*	*	*	-	-	*	*	*	*
Externe Antenne mit Anschluß	*	*	*	*	-	-	-	-	-	-
<b>SCHNITTSTELLEN</b>										
RS232	*	*	*	*	*	*	*	-	*	*
RS485	*	*	*	*	*	*	*	-	-	-
USB	*	*	*	*	*	*	*	-	-	-
Andere	-	-	-	-	4x DI, 4x DO	4x DI, 4x DO, 2x AI, 2x AO	4x Relay (220V/16A)	-	-	-
<b>SPECIAL FEATURES</b>										
Asynchron (Transparent)	*	*	*	*	-	-	*	*	-	-
Adressierter Modus	*	*	*	*	-	-	-	-	-	-
Repeater	*	*	*	*	-	-	-	-	-	-
SPP Profil	-	-	-	-	-	-	-	-	*	*
DUN Profil (Modem)	-	-	-	-	-	-	-	-	*	*
Mirroring /Spiegeln	-	-	-	-	*	*	-	-	-	-
Peer-to-peer	-	-	-	-	*	*	-	-	-	-
Trigger	-	-	-	-	*	*	-	-	-	-

# RF and Bluetooth Modules

# Adeunis RF

## ARF32



### Data/Data&Audio - Class2 Bluetooth® module for data transmission / Audio transmission

This miniature module enables full duplex Bluetooth® data or audio transmissions over 20m.

#### Technical Data:

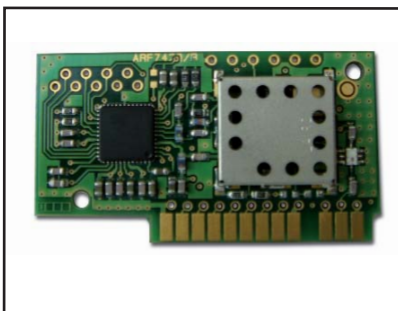
- ❑ Class 2 Bluetooth®
- ❑ Frequency on the free wavebands 2.4 - 2.5GHz
- ❑ Complies with the Bluetooth® V2 standard
- ❑ Radio rate up to 723 kbps
- ❑ Serial link rate: up to 921.6 kbps
- ❑ Integrated miniature antenna on the PCB
- ❑ On-board SPP profile totally compatible with the PDA, portable PC and Bluetooth® GSM

#### only Data&Audio:

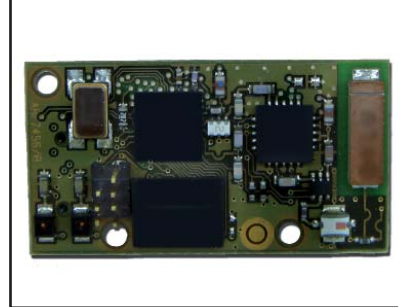
- ❑ Available in data - digital data&audio - analogic data&audio versions
- ❑ Audio profiles : HFP Handsfree - HSP Headset - HSAG AudioGateway
- ❑ CODEC audio integrated on the PCB (13-bit PCM CODEC) / analog version

The "Audio" versions offer, on top of the data features, an SCO link that supports HFP, HSP and HSAG profiles. By using the HSAG profile, the ARF32 module becomes a gateway to any generic Bluetooth headset. With the HFP and HSP profiles, and with additional basic microphone and speaker, the ARF32 module becomes a "hand free" system.

## ARF54



## ARF52



### Class1 Bluetooth® module

This miniature module enables two-way Bluetooth® transmission over a range of 150m.

#### Technical Data:

- ❑ Class 1 Bluetooth®
- ❑ Frequency on the free wavebands 2.4 - 2.5GHz
- ❑ Complies with the Bluetooth® V2 + EDR standard
- ❑ Radio rate up to 3 Mbps.
- ❑ Serial link rate: 921.6 kbps
- ❑ Integrated miniature antenna on the PCB or uFL antenna connector
- ❑ On-board SPP & DUN profile totally compatible with the PDA, portable PC and Bluetooth® GSM

This product covers most of the following applications: Payment Terminal, geolocation of trucks and transmission of environmental data. The main advantage of this module is that it can ensure a compatible with PDAs, laptops and GSM network.

## ARF44



### Multi-channel transceiver with $\mu\text{C}$ - 863/870MHz - 8mW

This module enables a two-ways digital link over a range of 300m.

Pre-certified, able to be used without a license, it uses the 863/870MHz band and is certifiable according to the European RTTE Directive EN 300-220 / EN 301-489.

#### Technical Data :

- ❑ Two-way digital link over 300 m
- ❑ 863-870MHz – multichannel- Wideband
- ❑ Module-Modem including a RF transceiver +  $\mu\text{C}$  + dedicated firmware
- ❑ On-board standard mode : Transparent
- ❑ Serial link: UART TTL
- ❑ Configuration and Set-up through Hayes commands

This product covers most applications requiring short-range communication, payment terminal, home applications, thermal regulation, traceability, "consumer market" intercom, automotive ...

### Multi-channel transceiver with $\mu\text{C}$ - 869 & 902/928MHz - 500mW

This module enables a two-ways digital link up to a range of 6000m.

#### Technical Data:

- ❑ Bidirectional digital link up to 6000 m
- ❑ 869 MHz – multi-channel: 1 (WB) - 3 (NB)
- ❑ 902-928 MHz – multi-channel wideband
- ❑ Power: 500mW (+27dBm)
- ❑ Modem module including RF transceiver +  $\mu\text{C}$
- ❑ Serial interface: UART TTL
- ❑ On-board standard modes: Transparent, Addressed, Secured Addressed, Firmware on demand
- ❑ Configuration and Set-up through Hayes commands
- ❑ Programmable emitting power and qualification of the RF signal (RSSI)

It covers most applications requiring long-distance communication, automatic watering control system, long distance GPS data transmission, yachting autopilot, fireworks launching system, modular remote control system, modular radio telemetry system ...and more generally all types of applications requiring long range or in particular disturbed environment.

# Adeunis RF

# Wireless Modems

## ARF43



### Middle range multi-channel RF modem RS232/RS485 or USB

The ARF43 RF modem enables two-way half duplex wireless data transmission over a range of 1000 m.

#### Technical Data:

- ❑ 863-870MHz (Europe) – multi-channel – Wide & Narrow bands
- ❑ multi-channel: 14 (WB) - 70 (NB)
- ❑ IP65 box ready for use
- ❑ Configuration through Hayes commands
- ❑ Complies with the European Standards RTTE EN300-220 / EN301-489

It covers most "middle-distance" wireless data transmission applications, from remote meter reading type point to point transmission to constitution of cordless multipoint local networks, in sectors of activity such as automation, robotics, remote management... and more generally all types of applications requiring middle range or in a particular disturbed environment.

## ARF53



### 500mW RF modem RS232/RS485 or USB, European & US versions

The ARF53 RF Modem enables two-way half duplex wireless data transmission over a range of 6000 m.

#### Technical Data:

- ❑ IP65 box ready for use
- ❑ Frequencies: 869.525MHz (Europe) - 902/928MHz (USA)
- ❑ Power: 500mW (+27dBm)
- ❑ multi-channel: 1 (WB) - 3 (NB)
- ❑ Configuration through AT commands
- ❑ Complies with the European standard RTTE EN300-220 / EN301-489

Industrial applications, long range transfers and / or in noisy environments (in-town network, difficult environments, agriculture, internal links ...)

## ARF73



### UHF Professional RF Modem

The ARF73 RF modem provides data transmission for applications requiring very long distances or working in harsh environment. It is available in a IP65 metal case, ready to use, works from 400Mhz to 470Mhz and is EN300-113 certified

#### Technical Data:

- ❑ A licensed professional band from 400 to 470MHz
- ❑ Frequency stability: +/- 1 kHz
- ❑ Improved automatic frequency correction calculation (up to 3kHz)
- ❑ 16 pre-programmed channels
- ❑ An output power selectable via software: 0.5W (27dBm) / 2W (33dBm) / 4W (36dBm)
- ❑ Sensitivity : -115 dBm
- ❑ Channel spacing: 12.5kHz (25kHz on request)
- ❑ Air rate: 9600 bps
- ❑ RS232 in transparent mode (RS422 or RS485 on demand)
- ❑ Authorisation for Europe

The ARF73 is the perfect solution for connecting any RS232/422 device such as PLCs, displays, or terminals.

## ARF45



### Serial to Wifi gateway

The ARF45 are a family of Serial to Wifi gateways. They permit an immediate connection of any serial device to a Wifi network with an enhanced level of security.

Available in a ready to use IP65 case, they allow a data wireless link over 200m.

The range comes in two versions:

- ❑ "Standard" model proposes RS232 / RS485 interface & complies with the 802.11b and 802.11g network standards with WPA-PSK (personal) security.
- ❑ "Pro" model works in RS232. In addition to all "standard" features, it complies with the 802.11i standard with an "advanced" WPA-2 Enterprise security protocol.

### Technical Data:

- ❑ Frequency: 2.412 à 2.484GHz
- ❑ 11Mbps and 54Mbps
- ❑ Protocols: Standard version: TCP-IP, DHCP, BOOTP, ICMP, ARP, UDP, ICMP, SNMP, DHCP, TFTP, Telnet, HTTP, HTTPS, Auto IP, SMTP
- ❑ Security: Standard version: WEP64, WEP128, WPA-PS
- ❑ Configuration via RS232 / connexion Telnet / serveur HTTP
- ❑ Complies with the European standard WIFI EN300-328

## ARF18 Remote control



### 1 to 8 keys 1-way and 2-ways radio remote control & receivers

The ARF18 low cost remote controls enable wireless control of 1 to 24 digital states (by simultaneously pressing 2 keys or switch) over a distance of 300m.

### Technical Data:

- ❑ 1 to 8 key
- ❑ Wireless control for 1 to 24 logical status up to 400m
- ❑ Monodirectional version with 433.92MHz
- ❑ Bi-directional version with 868MHz
- ❑ Specific marking on demand
- ❑ Comply with the European standard RTTE EN 300-220 / EN 301-489
- ❑ Receiver in OEM versions, 4 digital outputs, 4 relays and decoder, RS232 or USB, 433.92 or 868 MHz

## ARF62



### Class1 Bluetooth® RS232 Dongle

ARF62 dongles are wireless Bluetooth® Class1 network adaptors usable for full duplex data transfer between Bluetooth® equipments over 150m.

### Technical Data:

- ❑ Bluetooth® Class1 network adaptors
- ❑ Frequency on the free wavebands 2.4 – 2.5GHz
- ❑ Totally complies with the Bluetooth® V2 standard
- ❑ Radio rate up to 723 kbps
- ❑ Serial link rate: 9.6 to 115.2 kbps
- ❑ Configuration through AT commands
- ❑ Full RS232 serial port profile
- ❑ Specific Profil : GAP - SDAP - SPP - DUN - SPP config.
- ❑ Range: 150m
- ❑ Compact design with integrated antenna
- ❑ Available in DCE/DB9 female - DTE/DB9 male - DTE/DB15 male versions

They are able to replace cables to build any connection between a PSTN / GPRS modem and a PDA or between a PC and any Bluetooth® device.

# Antennas for special solutions

Article	Article No.
<b>Antennas for exterior mounting</b>	
868 - 870 MHz <b>Basic antenna</b> , incl. 5m cable RG58 (firmly at the angle) 0 dB, Length approx. 185mm	MC 01 14 039
900 MHz <b>Round emitter</b> 5 dB, N (female), incl. 16,5 cm stainless-steel bracket, white, 60cm	MC 01 14 062
900/1800 MHz <b>Roof antenna</b> , 5 dB, 4,2m cable RG58 FME (female), Ermitter hight approx. 210mm	MC 01 14 012
900/1800 MHz <b>Directional antenna</b> 7 dB, 2,5m cable, FME-socket, mast mounting plate, white, Ø 153mm	MC 01 14 018
900/1800 MHz/ <b>UMTS YAGI directional antenna</b> 8 element 11 dBi, FME (male), 10m RG58 cable FME (f/f)	MC 01 14 020-Dual
900/1800 MHz <b>Sector emitter for wind-powered devices</b> gain 8,5 dB, port N (female), 260x165x35mm	MC 01 14 043
900/1800 MHz <b>Round emitter for automatic assembly</b> 2,5 dB, cable 0,3m, FME (female), Ø 76mm	MC 01 14 077
900/1800 MHz <b>Round emitter for automatic assembly</b> 2,5 dB, cable 0,8m, FME (female), Ø 76mm	MC 01 14 077-80-Bu
900/1800 MHz <b>Round emitter for automatic assembly</b> 2,5 dB, cable 3m, FME (female), Ø 76mm	MC 01 14 078
900/1800 MHz/ <b>UMTS Round emitter</b> 2,15dBi, N (female), incl. 165mm stainless-steel bracket, white, 405mm	MC 01 14 065-UMTS
900/1800 MHz <b>Installation antenna</b> , 0 dB, FME (f) incl. cable 45cm RG316, Ø 45mm	MC 01 14 080-2
900/1800 MHz <b>Station antenna</b> , incl. 5m cable RG58 FME (female), 0 dB, incl. holder, Ermitter 269mm	MC 01 14 046
850/900/1800/1900 MHz <b>Round emitter</b> incl. 5m Low Loss, FME (f), incl. bracket, 2dB, Ermitter 219mm	MC 01 14 009
890-1890/1710-2200 MHz/ <b>GPS antenna for automatic assembly</b> 1,5 dBi, 3m, SMA (m) / FME (f), Ø 76mm	MC 01 14 042-2
<b>GPS installation antenna</b> , straight execution with 0,2m cable RG316, FME (female), Ø 47mm	MC 01 14 072
<b>GPS roof antenna</b> , 27 dBi typ, 3m RG174 SMA (male), Ø 76mm	MC 01 14 019
900/1800/1900 MHz/ <b>GPS Combination antenna</b> 0 dB, RG316, GSM=0,15m FME (m), GPS=0,2m FME (f)	MC 01 14 086
1920-2170 MHz ( <b>UMTS</b> ) <b>Outdoor antenna</b> , 5dB, N (female), Ermitter lenght 66cm	MC 01 14 064
1920-2170 MHz ( <b>UMTS</b> ) <b>Roof antenna without cables</b> , Ermitter 115mm, FME (male)	MC 01 14 022
900/1800/2100 MHz ( <b>UMTS</b> ) <b>Panel antenna</b> 10 dBi, 5m cable FME (f), mounting plate, 162x142x45mm	MC 01 14 129
900/1800/1900 MHz/ <b>UMTS Round emitter</b> incl. 5m Low Loss, FME (f), incl. bracket, 2dB, Ermitter 219mm	MC 01 14 009-UMTS
Quadband / <b>UMTS Round emitter for automatic assembly</b> 2,5 dB, 3m RG174, FME (f), Ø 76mm	MC 01 14 078-Q
AMPS/900/1800/1900 MHz/ <b>UMTS roof antenna</b> without cable, 0 dB, FME (male), Ermitter approx. 90mm	MC 01 14 079
850/900/1800/1900/2100 MHz/ <b>W-LAN roof antenna</b> 5m RG174, GPS=SMA (m), GSM/W-LAN=FME (f)	MC 01 14 084
900/1800/1900 MHz/ <b>UMTS KATHREIN roof antenna without cable</b> , 0 dB, Minicrimp	K 705564
<b>Sticking antennas</b>	
900/1800 MHz <b>Planar sticking antenna</b> , 1 dBi, 2,7m cable RG174, FME (female), Ø 35mm	MC 01 14 005
900/1800 MHz <b>Windshield antenna</b> , 2 dB, 3m cable RG174, FME (female), Ø 68mm	MC 01 14 032
900/1800 MHz <b>GSM mini dual band antenna</b> , 1,5 dB, 3m cable RG174 FME (female), 40x44x12mm	MC 01 14 044
900/1800 MHz <b>Windshield antenna</b> , 0 dB, cable 3m FME (female), ultra flat 100x12x2,5 mm	MC 01 14 048
900/1800 MHz <b>sticking antenna</b> , 0 dB, 2,5m cable RG174, FME (female), Ø 33mm	MC 01 14 080-1
900/1800/1900 MHz <b>Sticking antenna</b> , 0 dB, 3m cable RG174, FME (female)	MC 01 14 069
<b>GPS active magnetic antenna</b> , 1 dB, 3m cable RG174, 3-5V, SMB (female), 40x44mm	MC 01 14 004
<b>GPS active magnetic antenna</b> , 1 dB, 3m cable RG174, 3-5V, SMA (male), 40x44mm	MC 01 14 004-SMA
900/1800 MHz <b>GPS/GSM planar antenna</b> , 2 dB, 3m cable RG174 GSM=FME(f), GPS=SMA (m), Ø 68mm	MC 01 14 016
<b>GPS interior sticking antenna</b> 3m cable RG174, FME (female), Ø 38mm	MC 01 14 073
900/1800 MHz / <b>GPS sticking antenna</b> , 2,3m cable RG174, GSM=FME (f), GPS=SMA (m), 122x25x26mm	MC 01 14 075-sma-fme
900/1800 MHz / <b>GPS sticking antenna</b> , 1 dBi, 3m cable GSM=FME (f), GPS=SMA (m), Ø 38 mm/H 13mm	MC 01 14 098
850/900/1800/1900/ <b>GPS/UMTS sticking antenna</b> , 3m RG174, GSM=FME (f), GPS=SMA (m), 100x66x19mm	MC 01 14 050
850/900/1800/1900/ <b>GPS/UMTS sticking antenna</b> , 3m RG174, GSM=Fakra (f) bordaux / GPS=Fakra (f) blue	MC 01 14 050-fakra-C-D
900/1800 / <b>UMTS sticking antenna</b> , 2,15 dBi, 2,8m RG174, FME (female), 115x22 mm	MC 01 14 111
900/1800/1900 MHz / <b>UMTS sticking antenna</b> , 0 dB, 3m RG174 FME (female), Ø 53mm	MC 01 14 013
900/1800/1900 MHz / <b>UMTS sticking antenna</b> , 0 dB, 50cm RG174 Fakra (male), Ø 53mm	MC 01 14 013-50-fakra
900/1800/1900 / <b>UMTS sticking antenna</b> , 2,1 dBi, 2,5m RG174 FME (female), Ø 57 mm	MC 01 14 085
900/1800/1900 MHz / <b>GPS/UMTS sticking antenna</b> , 3m RG174, GPS=SMA (m), GSM=FME (f), Ø 70 mm	MC 01 14 045
<b>GPS magnet foot / sticking antenna</b> 5DBi, 3m, Fakra (female) blue	MC 01 14 131
<b>Magnet foot antennas</b>	
900 MHz <b>MINIMAG Magnet foot antenna</b> 3 dB, 2,40m cable, FME (female), emitter height 180mm	MC 01 14 010
900/1800 MHz <b>Magnet foot antenna</b> 3 dB, 2,5m cable, FME (female), emitter height approx. 195mm	MC 01 14 007
900/1800 MHz <b>Magnet foot antenna</b> 3,6m RG58 FME (female), D-net 5dB, E-net 3dB, emitter height 320mm	MC 01 14 037
900/1800 MHz <b>Minimag antenna</b> 0 dB, 2,5m cable RG174, FME (female), emitter height 105mm	MC 01 14 033
900/1800 MHz <b>Mini magnet foot antenna</b> 0/3 dB, 2,5m RG174 FME (female), emitter approx. 105mm	MC 01 14 055
900/1800 MHz <b>water proof magnet foot antenna</b> 1 dB, 3m RG174 FME (female), Ø 68 mm	MC 01 14 145
900/1800/1900 MHz <b>Magnet foot antenna</b> 0 dB, 2,5m cable FME (female)	MC 01 14 036
900/1800 MHz <b>Magnet foot antenna</b> 3 dB, 3m RG174 FME (female), emitter height approx. 115mm	MC 01 14 052
850/900/1800/1900 MHz/ <b>UMTS Magnet foot antenna</b> , 2 dBi, height 86mm, 2,5m RG174, FME (female)	MC 01 14 027
850/900/1800/1900 MHz/ <b>UMTS Magnet foot antenna</b> , 2 dBi, height 86mm, 2,5m RG174, SMA (male)	MC 01 14 027-SMA-ST
850/900/1800/1900 MHz/ <b>UMTS Magnet foot antenna</b> height approx. 90mm, 2,5m RG174, FME (female)	MC 01 14 026-MH
<b>GPS active Mini Magnet antenna</b> 3,0m RG 174 MMCX (male), approx. 38x40mm	MC 01 14 002
<b>GPS active magnetic antenna</b> , 3m cable RG174, SMA (male), Ø 69mm	MC 01 14 003
<b>GPS magnet foot / sticking antenna</b> 5DBi, 3m, Fakra (female) blue	MC 01 14 131





# Antennas for special solutions

Article	Article No.
<b>Portable antennas</b>	
420 - 470 MHz <b>Portable antenna</b> 2,15 dBi, 1/2 lambda, FME (female), length approx. 165mm	MC 01 14 057
868-870 MHz <b>Portable antenna</b> flexible, approx. 5 dB, 1/2 lambda, FME (female), length approx. 185mm	MC 01 14 017
Base for MC 01 14 017 incl. cable 5m open end	MC 01 14 017-1
890-960 MHz <b>Portable antenna</b> flexible, 3 dB, 1/2 lambda, FME (female), length approx. 170mm	MC 01 14 056
890-960 MHz <b>Portable antenna</b> rigid, 3 dB, 1/2 lambda, FME (female), length approx. 180mm	MC 01 14 056-1
850/1900 MHz <b>Portable antenna</b> 0 dB, length 160mm, FME (female) <b>*only USA dual net*</b>	MC 01 14 038
900/1800 MHz <b>Portable antenna</b> 0 dB, length 100mm, two-way breakable, FME (female)	MC 01 14 031
900/1800 MHz <b>Portable antenna</b> 0 dB, length 110mm, two-way breakable, SMA (male)	MC 01 14 031-SMA
900/1800 MHz <b>Portable antenna</b> 1/2 lambda, 2 dB, length approx. 160mm, 5FME (female)	MC 01 14 066
824-960/1710-1990 MHz <b>Portable antenna</b> 0 dB, 1/4 lambda, length 100mm, SMA (male)	MC 01 14 067
824-960/1710-1990 MHz <b>Portable antenna</b> 0 dB, 1/4 lambda, length 100mm, FME (female)	MC 01 14 068
850/900/1800/1900 MHz / <b>UMTS Portable antenna</b> 0 dB, length 60mm, FME (female)	MC 01 14 113
850/900/1800/1900 MHz / <b>UMTS Portable antenna</b> 0 dB, length 60mm, FME angle (female)	MC 01 14 113-FME-Bu-W
850/900/1800/1900 MHz / <b>UMTS Portable antenna</b> 0 dB, length 60mm, SMA (male)	MC 01 14 113-SMA
850/900/1800/1900 MHz / <b>UMTS Portable antenna</b> 0 dB, length 60mm, SMA angle (male)	MC 01 14 113-SMA-W
824-960/1710-1990 MHz <b>Mini antenna</b> 0 dB, length approx. 40mm, SMA (male)	MC 01 14 014
824-960/1710-1990 MHz <b>Mini antenna</b> 0 dB, length approx. 40mm, FME (female)	MC 01 14 015
824-960/1710-1990 MHz <b>Mini antenna</b> 0 dB, length approx. 40mm, FME (female) bent	MC 01 14 015-FME-Bu-W
900/1800 MHz <b>Modem antenna</b> 0 dB, emitter height approx. 85mm, FME (female)	MC 01 14 024
<b>1,9 / 2,4 GHz antennas</b>	
1850-1990 MHz <b>DECT portable antenna</b> length approx. 100mm, FME (female)	MC 01 14 060
1850-1990 MHz <b>UHF-antenna</b> 5 dB, emitter length approx. 800mm	MC 01 14 058
900/1800 MHz/2,4 GHz <b>Round emitter for automatic assembly</b> 2,5 dB, cable 3m, FME (female), Ø 76mm	MC 01 14 078-W-LAN
2,4 GHz <b>Portable antenna</b> 2 dBi, breakable, length approx. 110mm, SMA (male)	MC 01 14 028
2,4 GHz <b>Portable antenna</b> 2 dBi, breakable, length approx. 110mm, <b>R-SMA</b> (male)	MC 01 14 028-R
2,4 GHz <b>Basic antenna</b> 0 dB, N (female), without angle and cable, length approx. 175mm	MC 01 14 094
2,4 GHz <b>Basic antenna</b> 5 dB, N (female), with angle, without cable, length approx. 900mm	MC 01 14 095
2,4 GHz <b>Round emitter</b> 2,14 dBi, 5m RG58 FME (female), length 100mm, incl. mounting	MC 01 14 124
<b>2,4 - 5,8 GHz antennas</b>	
2,4-5,8 GHz <b>Round emitter</b> 8 dBi, N (female), length 590mm, without cable	MC 01 14 123
2,4-2,5 / 5,1-5,9 GHz <b>Portable antenna</b> 3 dBi, two-way breakable, SMA (male), length 200mm	MC 01 14 126
2,4-2,5 / 5,1-5,9 GHz <b>Portable antenna</b> 5 dBi, two-way breakable, SMA (male), length 200mm	MC 01 14 127
5,1-5,9 GHz <b>Portable antenna</b> 10 dBi, two-way breakable, SMA (male), length 200mm	MC 01 14 125
5,8-5,9 GHz <b>Magnetic antenna</b> 3 dBi, two-way breakable, 1,5m RG174 SMA (male), length 220mm	MC 01 14 132
<b>Other antennas</b>	
800 - 2000 MHz <b>M90 BXO</b> without case, Ø 83mm, 20cm RG174, MMCX male angle	MC 01 14 081
900/1800 MHz <b>Window-Clip antenna</b> 0 dB, 2,5m cable RG174, FME (f), Ermitter approx. 80mm	MC 01 14 041
900/1800 MHz <b>Plate antenna</b> 0 dB, 17x18mm	MC 01 14 035
900/1800 MHz <b>Plate antenna</b> 0 dB, Ø 26,6mm	MC 01 14 080
900/1800 MHz <b>Blade PCMCIA antenna</b> , SMRN (female), length 60mm	MC 01 14 090
900/1800 MHz <b>Blade PCMCIA antenna</b> , MMCX (male), length 60mm	MC 01 14 092
1800/1900 MHz <b>Blade PCMCIA antenna</b> , MMCX (male), length 60mm	MC 01 14 093
900/1800/1900 MHz <b>Print plate</b> approx. 105x22mm, 0 dB	MC 01 14 069-Print
900/1800 / <b>UMTS Clip antenna</b> 0,5m RG174, two-way breakable, <b>MC-Card (male)</b>	MC 01 14 001
<b>GPS active antenna</b> without case, 20cm cable SMA (male), 35 x 35 x 5 mm	MC 01 14 006
<b>GPS/GSM 900/1800 MHz PCB combination antenna</b> without case, 3-5V, 25mA, cable on request	MC 01 14 042-2-PCB
<b>Antenna adapter</b>	
Antenna adapter FME (female) / FME (female)	NI-101
Antenna adapter FME (male) / FME (male)	NI-106
Antenna adapter FME (male) / SMA (male)	NI-108
Antenna adapter FME (female) / FME (male), angle	NI-130
Antenna adapter FME (female) / SMA (female)	NI-127
Antenna adapter SMA (female), angle / SMA (male)	NI-1352
Antenna adapter BNC (male) / FME (male) - identical Kathrein K 62182 -	NI-103
Antenna adapter BNC (male) angle / FME (male)	NI-110
Antenna adapter N (male) / FME (male), color nickel	NI-104SI
Antenna adapter TNC (male) / FME (male) - identical Kathrein K 62181 -	NI-12

The length refers to the mounted condition!

# Antennas for special solutions



## Antennas for the exterior mounting



MC0114009    MC0114012    MC0114018    MC0114019    MC0114020-dual    MC0114022    MC0114039    MC0114042-2    MC0114046



MC0114043    MC0114062/65    MC0114064    MC0114072    MC0114077 (top)    MC0114084    MC0114129    K705564  
MC0114080-2    MC0114078 (bottom)

MC0114079  
*Fig. similar*

## Sticking antennas



MC0114003    MC0114005    MC0114013    MC0114016    MC0114032    MC0114044/004    MC0114045    MC0114085



MC0114048    MC0114050    MC0114069    MC0114073    MC0114075 -sma-fme    MC0114080-1    MC0114098    MC0114111

## Antenna adapter





# Antennas for special solutions

## Magnet foot antennas



o: MC0114002  
u: MC0114131

MC0114007

MC0114010

MC0114026-MH

MC0114027  
MC0114027-2,4

MC0114033

MC0114036

MC0114037

MC0114052

MC0114055

## Portable antennas



MC0114145

MC0114014  
MC0114015  
MC0114015-FME-BU-W

l: MC0114017-1  
r: MC0114017

MC0114024

l: MC0114031-SMA  
r: MC0114031

MC0114038  
MC0114066

MC0114056

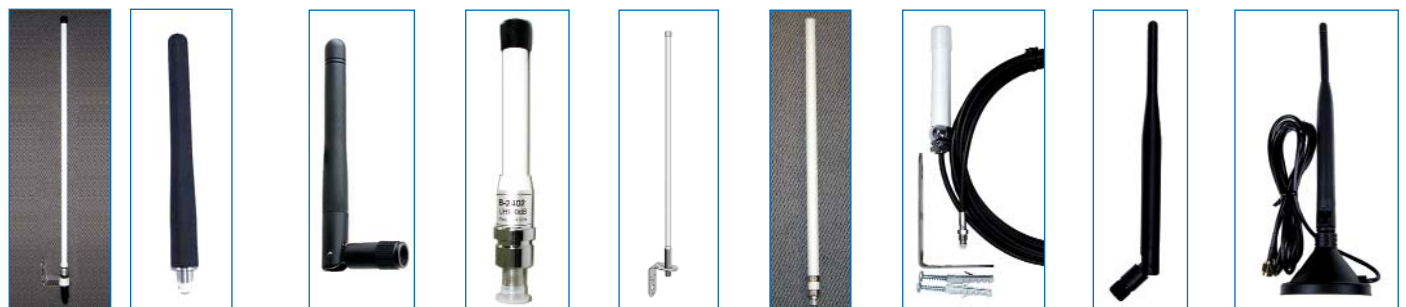
MC0114057

l: MC0114067  
r: MC0114068

MC0114113

## 1,9 GHz antennas

## 2,4 GHz ... 5,8 GHz antennas



MC0114058

MC0114060

MC0114028

MC0114094

MC0114095

MC0114123

MC0114124

MC0114125  
MC0114126  
MC0114127

MC0114132



## Further antennas



MC0114001

MC0114006

top: MC0114035  
bottom: MC0114080

MC0114041

MC0114069  
-print

MC0114092  
MC0114093

# Adapter

## Murata



**GSC-F-Male - FME installation (male)**  
15 cm = MC1213 Adapter 177  
20 cm = MC1213 Adapter 077



**GSC-F-Male - FME installation (male)**  
10 cm = MC1213 Adapter 088  
20 cm = MC1213 Adapter 044



**GSC-F-Male - FME installation (male)/Grid**  
135 mm = MC1213 Adapter 141  
200 mm = MC1213 Adapter 076



**GSC-F-Male - SMA installation (female)**  
7 cm = MC1213 Adapter 186  
10 cm = MC1213 Adapter 097  
15 cm = MC1213 Adapter 163  
20 cm = MC1213 Adapter 098



**GSC-F-Male - SMA installation (female)**  
10 cm = MC1213 Adapter 111  
20 cm = MC1213 Adapter 222



**GSC-F-Male - SMA cable (male)**  
20 cm = MC1213 Adapter 099



**GSC-F-Male - TNC installation (female)**  
15 cm = MC1213 Adapter 110



**GSC-Male - FME installation (male)**  
17x11mm  
MC1213 Adapter 835  
*Lieferung ohne Kabel!*

## Fakra Adapter



**Fakra universal (female) - FME (male)**  
15 cm RG174  
MC1213 Adapter 188



**Fakra universal (male) - FME (male)**  
15 cm RG174  
MC1213 Adapter 189



**U.FL-V066F-male - 9,6cm - SMBA installation (female) (D)**  
MC1213 Adapter 236



**U.FL-V066F-male - 9,6cm - SMBA installation (female) (C)**  
MC1213 Adapter 237

## Hirose



**U.FL-V04F-male FME installation (male)**  
10 cm = MC1213 Adapter 220  
20 cm = MC1213 Adapter 221



**U.FL-V04F-male SMA installation (female)**  
10 cm = MC1213 Adapter 224  
20 cm = MC1213 Adapter 225



**U.FL-088F-male FME installation (male)**  
10 cm = MC1213 Adapter 620  
20 cm = MC1213 Adapter 621



**U.FL-088F-male SMA installation (female)**  
8 cm = MC1213 Adapter 629  
10 cm = MC1213 Adapter 624  
20 cm = MC1213 Adapter 625  
40 cm = MC1213 Adapter 633



**U.FL-V66F-male - FME installation (male)**  
8 cm = MC1213 Adapter 232  
12 cm = MC1213 Adapter 230  
15 cm = MC1213 Adapter 231  
20 cm = MC1213 Adapter 233



**U.FL-V66F-male - SMA installation (female)**  
8 cm = MC1213 Adapter 229  
10 cm = MC1213 Adapter 228  
15 cm = MC1213 Adapter 227



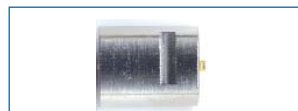
**U.FL-V66F-male - SMA (male)**  
15 cm = MC1213 Adapter 226



**U.FL-V66F-male - SMB (male)**  
12 cm = MC1213 Adapter 330



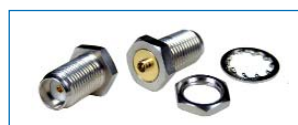
**U.FL-V66F-male - SMC installation (male)**  
150 mm = MC1213 Adapter 488



**U.FL-V66F-male - SMP angle (female)**  
9,5 cm = MC1213 Adapter 250



**Hirose - FME installation (male) with grid, 16x12mm**  
MC1213 Adapter 836



**Hirose U.FL-R-SMT (male) - FME installation (male)**  
MC1213 Adapter 834

**Hirose U.FL-R-SMT (male) - SMA installation (female)**  
MC1213 Adapter 839

# Adapter / Cable / Tools

## Various Adapter



**MC-Card angle (male) - FME (male)**  
20cm RG174  
GLOBE T-ADAPTER 2



**FME installation (male) - SSMB Nano angle (female)**  
25 cm  
MC1213 Adapter 021



**SSMB Nano (female) - FME (male)** RG174  
10cm = MC1213 Adapter 151  
20cm = MC1213 Adapter 013  
50cm = MC1213 Adapter 171  
300cm = MC1213 Adapter 153



**MMS angle (male) - open end**  
RG174  
25cm = MC1213 Adapter 365  
50cm = MC1213 Adapter 364



**SMP angle (female) - FME installation (male)**  
RG174  
15cm = MC1213 Adapter 165  
25cm = MC1213 Adapter 131



**SMP angle (female) - FME cable (male)**  
25 cm RG174  
MC1213 Adapter 132

## Cable



**Low Loss\*** coaxial cable 50 Ohm, FME-Bu/-Bu  
- manufactured in length 0,3/1/2/5/10/20 m



**Aircom Plus** coaxial cable 50 Ohm  
- manufactured in length 5/10/20 m



**RG174\*** coaxial cable  
- Manufacturing on request



**RG58\*** coaxial cable  
- manufactured in length 0,3/1/2/5/10/20 m



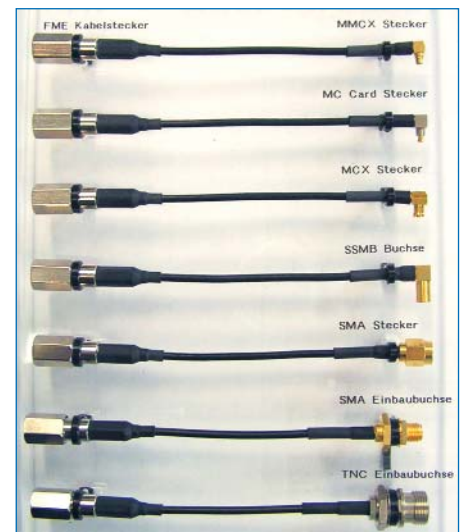
**H155\*** coaxial cable  
- Manufacturing on request



**Cable 6 core, 100m flat, black**  
Art-Nr. MC1213930

*\* also available as 100m ring*

## HF adapter cable



**Other Lengths available on request!**

**We produce individual adapters and cables for you according to your request!  
We modify each antenna with the desired connectors!**

## Tools



< **Universal crimpset** in the suit-case for RG122 / 174 / 179 / 178 / 180 / 187 / 188 / 195 / 316  
Art-No. Crimp-Koffer

**Screwdriver > Krafform-Plus-Heft 62550**  
TX-5 = Art-No. Torx-5  
TX-6 = Art-No. Torx-6  
TX-7 = Art-Nr. Torx-7



**Crimping pliers >**  
for RG58 / RG59 / RG174  
Art-No. Crimp Zange 2

< **Professional pliers universal**  
Westernplug 4/4-8/8, metal  
Art-No. MC1213927



# Assembly accessories for modules / Applications

## Cable for data modules



**Flexible wire, 1:1**  
 25 mm = MC1213565-3  
 27 mm = MC1213565-2  
 30 mm = MC1213565  
 80 mm = MC1213563  
 100 mm = MC1213564



**Murata HF cable GSC Bu/Bu (MXTK88TKxxxx)**  
 30 mm = MC1213573  
 50 mm = MC1213574  
 80 mm = MC1213571  
 100 mm = MC1213575  
 200 mm = MC1213572



**Flexible wire, turned**  
 28 mm = MC1213569-1  
 42 mm = MC1213569  
 50 mm = MC1213567-7  
 80 mm = MC1213566

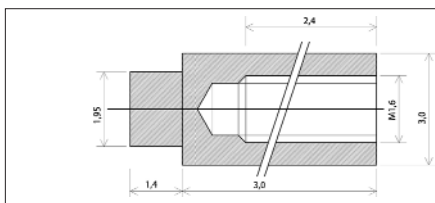


**Hirose U.FL-2LP(V)-04-A cable double-sided coated**  
 35 mm = MC1213598-1  
 50 mm = MC1213597  
 100 mm = MC1213595  
 200 mm = MC1213596

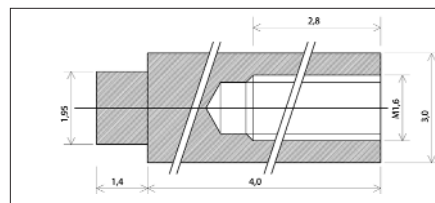


**Hirose U.FL-2LP-060-A cable double-sided coated**  
 60 mm = MC1213588-60  
 100 mm = MC1213588  
 200 mm = MC1213589

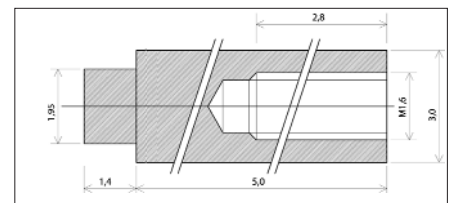
## Distance bolt



M 1,6x3 mm  
 MC1213850-D-BOLZ-3



M 1,6x4 mm  
 MC1213850-D-BOLZ-4



M 1,6x5 mm  
 MC1213861-D-BOLZEN

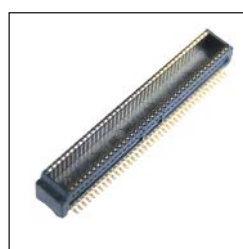
## SIM Card Reader / Holder



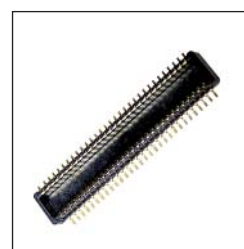
**Molex SIM Card Holder** MC1213911 (left)  
**Reader** MC1213912-2 (right)



**Amphenol SIM Card Reader/Holder**  
 MC1213559-2



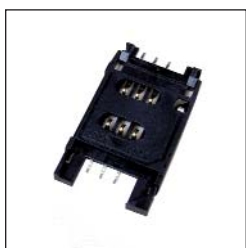
**Molex Connector**  
 80 pin  
 3mm = MC1213955  
 4mm = MC1213956 (Fig.)



**Molex Connector**  
 60 pin  
 2,5mm = MC1213958



**Molex SMT ZIF**  
 40 pin, 0,5mm  
 Top = MC1213561  
 Bottom = MC1213562 (Fig.)



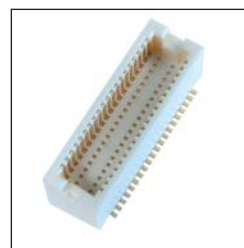
**Amphenol SIM Card Reader incl. Holder**  
 MC1213559-3



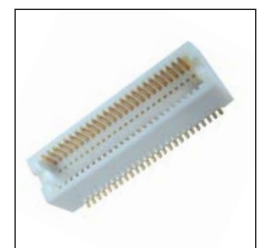
**Yamaichi SIM Card Reader/Holder (push-push)**  
 MC1213610



**Hirose DF12**  
 80 pin, 3mm, with Boss  
 MC1213582-1



**Hirose DF12**  
 40 pin, 5mm  
 with Boss = MC1213585  
 without Boss = MC1213585-1



**Hirose DF12**  
 50 pin  
 3mm = MC1213591  
 5mm = MC1213592 (Fig.)  
 other heights on request

# Connectors



FME (female)  
crimp RG174



FME (male)  
crimp  
RG174



FME installation  
(male) crimp  
RG174  
A-No. Ni-123



N installation  
(female) crimp  
RG174  
A.-No. 1070114



N (male) crimp  
RG174



MMCX (male)  
RG174  
A.-No. 1077332



MCX cable  
angle (male)  
RG174  
A.-No. 1071096



SMB crimp  
angle (male)  
RG174  
A.-No. 1070043



SMB angle  
(female)  
RG174  
A.-No. 1070601



SMB crimp  
(male)  
RG174  
A.-No. 1075143



SMB (female)  
gold  
RG174  
A.-No. 1071301



SMA cable  
(female)  
RG174  
A.-No. 1070371



SMA cable  
angle (male)  
RG174  
A.-No. 1070965



SMA cable  
(male)  
RG174  
A.-No. 1071645



SMA crimp  
angle (male)  
RG174  
A.-No. 1070964



SMC cable  
(female)  
RG174  
A.-No. 1071316



SSMB-Nano  
(female)  
RG174  
A.-No. 1070290



SSMB-Nano  
cable angle  
(female) gold,  
RG174  
A.-No. 1070293



SMA (female)  
RG58  
J01151A0491



SMA (male)  
RG58  
A.-No. 1070711



SMA angle  
(male)  
RG58  
A.-No. 1070714



FME (female)  
crimp  
RG58



FME (male)  
RG58



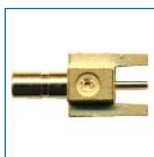
N (male) crimp  
RG58  
J01020A0108



N (female)  
crimp  
RG58



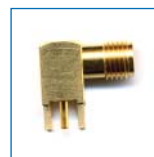
SMB crimp  
angle (male)  
RG178  
A.-No. 1070040



SSMB-Nano  
(male) print  
assembly  
A.-No. 1071937



MCX (female)  
print assembly  
A.-Nr. 1070047



SMA (female)  
print assembly  
SMA-Bu-W-Print



N (male)  
RG58  
UG536STG



N (female)  
BNC (male)  
Adapter  
UG349STG



N (female)  
BNC (male)r  
Adapter  
UG1034STG



top:  
Aircom Plus (female)  
bottom:  
Aircom Plus (male)



TNC angle  
(male)



MMS angle  
(male) RG174 -  
only  
manufactured  
(Page 45)



Western-Plug  
6P/6C, RJ45  
MC1213929

## Reverse Adapter



left:  
**SMA (female) - R-SMA (male)**  
right:  
**R-SMA (female) - SMA (male)**

**Further connectors available on request.**

# SMBA RF-coaxial connectors (FAKRA)

The SMBA® connectors are specially designed for automotive applications. They are based on the SMB connector interface and comply with the standard for a uniform connector system established by FAKRA (Automobile Expert Group). Due to their special standardised locking system SMBA® connectors fulfil the high functional and safety requirements of today's automotive industry.

SMBA® connectors are equipped with a standardised coding system which permits easy and fast assembly using thirteen possible codings.

The locking system with primary and secondary locking guarantees high estreliability of assembly and contact. Even in vehicle areas with high stress, for example vibrations, SMBA® connectors will al ways guarantee correct data transfer.

Jack Kuppler	Application Anwendung	Color Farbe	RAL number RAL-Nummer	Coding (X) Codierung (X)	Plug Stecker
	Analog radio without supply voltage Analogradio ohne Speisespannung	Black Tiefschwarz	9005	A	
	Analog radio with supply voltage Analogradio mit Speisespannung	Creme-white Cremeweiß	9001	B	
	GPS: telemetry or navigation GPS: Telematik oder Navigation	Signal-blue Signalblau	5005	C	
	Cellular phone Mobiltelefon	Bordeaux-violet Bordeauxviolett	4004	D	
	TV 1	Leaf-green Laubgrün	6002	E	
	TV 2	Nut-brown Nussbraun	8011	F	
	Remote control keyless entry Funkfernbedienung Zentralverriegelung	Blue-grey Blaugrau	7031	G	
	GPS: telemetry and navigation GPS: Telematik und Navigation	Heather-violet Erikaviolett	4003	H	
	Remote control auxiliary heating or bluetooth Funkfernbedienung Standheizung oder Bluetooth	Beige	1001	I	
	Radio with IF output (antenna diversity) Radio mit ZF-Ausgang (Antennenvielfalt)	Curry Currygelb	1027	K	
	Not defined Nicht definiert	Carmine-red Karminrot	3002	L	
	Not defined Nicht definiert	Pastell-orange Pastellorange	2003	M	
	Not defined Nicht definiert	White-green Weißgrün	6019	N	



SMBA cable (female)  
RG174  
A-No. 1077242



SMBA cable (male)  
RG174  
A-No. 1077244



SMBA cable (female)  
RG174  
A-No. 1073925



SMBA cable (male)  
RG174  
A-No. 1079370



SMBA cable (female)  
RG174  
A-No. 1077672



# RF-coaxial connectors/Battery contacts

IMS

## General Information



**SMBA (Fakra)**  
Connectors  
Snap-on  
4 GHz



**SMP**  
Miniature Connectors  
Snap-on or Slide-on  
12 GHz



**SMA**  
Connectors  
Screw lock  
18 GHz



**SMB**  
Connectors  
Snap-on  
4 GHz



**SMC**  
Connectors  
Screw lock  
10 GHz



**SMS**  
Connectors  
Slide-on  
4 GHz



**SSMB-Nano**  
Micro Miniatur  
Connectors  
Snap-on or Slide-on  
12,4 GHz



**SMM**  
Connectors  
Snap-on  
6 GHz



**MMCX**  
Micro Miniatur  
Connectors  
Snap-on  
6 GHz



**MCX**  
Connectors  
Snap-on  
6 GHz



**High voltage inserts**  
High voltage inserts  
D-Sub- and DIN  
Connectors  
2,8 KV / 50 Hz



**Coaxial inserts**  
coaxial inserts  
DIN 41612  
Connectors  
10 GHz



**Coaxial inserts**  
coaxial inserts  
D-Sub-Connectors  
10 GHz



**N**  
Connectors  
Screw lock  
18 GHz



**7/16**  
Connectors  
Screw lock  
7,5 GHz



**FME**  
Connectors  
Screw lock  
3 GHz



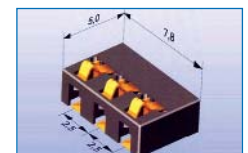
**BNC**  
Connectors  
Bayonet lock  
4 GHz



**TNC**  
Connectors  
Screw lock  
4 GHz



**1.6 / 5.6**  
Connectors  
Screw lock  
8 GHz



**AGK-3835**  
- SMD leaf spring  
battery contact  
- Variable height  
- Suitable for lead  
free soldering  
- Space saving design

# BINDER

## Subminiatur circular connectors



**Series 420  
Micro  
Push-Pull**

- Push-Pull
- Degree of protection IP 67
- Cable outlet 3-4 mm



**Series 430  
Push-Pull**

- Push-Pull
- Degree of protection IP 40 / 67
- Cable outlet 3,5 - 5 mm
- 360° EMC protected shielding



**Series 620  
Snap-in**

- Connector with snap-in locking
- Degree of protection IP 67
- Internal strain relief
- Easy assembly



**Series 702  
M9**

- Connector moulded on PUR-cable
- 360° EMC protected shielding
- Degree of protection IP 67
- 2 und 5 m cable length
- Compatible with connector series 711, 712



**Series 709  
Snap-in**

- Connector moulded on PVC-cable
- Very flat angled version
- Degree of protection IP 40
- Diameter or width only 9 mm
- 2 und 5 m cable length
- Compatible with connector series Serie 719



**Series 710  
Bajonett**

- Bayonet locking
- Degree of protection IP 40
- Diameter 12 mm
- Cable outlet in 2 sizes
- Cable housing with integrated strain relief



**Series 711  
M9**

- Connector with screw locking
- Degree of protection IP 40
- Diameter 12 mm
- Cable outlet in 2 sizes
- Cable housing with integrated strain relief



**Series 712  
M9**

- Connector with screw locking
- Degree of protection IP 67
- Metal housing with 360° EMI protected shielding
- Easy assembly
- Compatible to series 702, 712



**Series 719  
Snap-in**

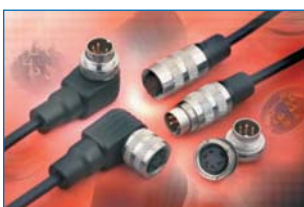
- Connector with snap-in locking
- Degree of protection IP 40
- Versions with and without strain relief
- Compatible to series 709

## Miniature circular connectors



**Series 423  
M16**

- Connector with screw locking according to IEC 130-9
- Degree of protection IP 67
- Internal strain relief
- Excellent EMC shielding
- Angled connector adjustable in 4 angled positions
- Versions with shielding rings or cable clamp



**Series 425  
M16**

- Connector with screw locking according to IEC 130-9
- Degree of protection IP 67
- Compatible to 423 and 723 series



**Series 440  
Push-Pull**

- Connector with Push-Pull locking
- Degree of protection IP 67
- Shielded cable connector with excellent EMC protection
- Cable outlet 4-8 mm
- Pressing screw with immunity to vibration

# BINDER

## Miniature circular connectors



**Series 581  
M16**

- Connector screw locking according to IEC 130-9
- Degree of protection IP 40
- Metal housings with good EMC characteristics
- Cost-effective plastic versions
- Internal strain relief



**Series 678  
Bajonett**

- Connector with bayonet locking
- Degree of protection IP 40
- Assembling with self tapping screw
- Internal strain relief



**Series 680  
M16**

- Connector screw locking according to IEC 130-9
- Degree of protection IP 40
- With preassembled solder ring for good ground connection
- Internal strain relief



**Series 682  
M16**

- Connector screw locking according to IEC 130-9
- Degree of protection IP 40
- Metal housings with good EMC characteristics
- Angled connector adjustable in 4 angled positions
- Internal strain relief



**Series 720  
Snap-in**

- Connector with snap-in locking
- Degree of protection IP 67
- Internal strain relief
- Easy assembly



**Series 723  
M16**

- Connector screw locking according to IEC 130-9
- Degree of protection IP 67
- Internal strain relief
- Easy assembly
- Angled connector adjustable in 4 angled positions

## Circular connectors for machines



**Series 623  
M23**

- Connector with screw locking
- Degree of protection IP 67
- With and without shielding
- Metal construction



**Series 690  
Bajonett**

- Connector with bayonet locking
- Degree of protection IP 40
- Transparent cable bushing
- Internal strain relief



**Series 691  
M26**

- Connector with screw locking
- Degree of protection IP 40
- Transparent cable bushing
- Internal strain relief



**Series 692  
RD 24**

- Connector with screw locking
- Degree of protection IP 67
- Screw and solder termination
- Internal strain relief



**Series 693  
RD 24**

- Connector with screw locking
- Degree of protection IP 67
- VDE-, UL- and SEV approvals
- Screw and solder termination
- Internal strain relief



**Series 694  
RD 30**

- Connector with screw locking
- Degree of protection IP 65
- Connectors with solder and screw termination
- Internal strain relief
- Cable outlet up to 16 mm (.63 in.)

# BINDER

## Sensor connectors



**Series 707  
M5**

- Connector with M5x0,5 screw-locking
- Degree of protection IP 67 / IP 68
- Connector moulded on cable
- Thread nut with immunity to vibration
- Cable length 2m and 5m (PUR)



**Series 718  
M8**

- Circular connector with screw-locking or snap-in locking
- Degree of protection IP 65 / IP 67
- Connector moulded on cable
- Cable length 2m and 5m
- Compatible to series 768



**Series 768  
M8**

- Circular connector with screw-locking
- Degree of protection IP 67
- Metal housing with 360° EMC protected shielding
- Screw- and solder termination
- Compatible to series 718



**Series 713  
M12  
A-Kodierung**

- Circular connector with screw-locking
- Degree of protection IP 67
- Metal housing with 360° EMC protected shielding
- Cable assembly possible
- Screw termination
- Compatible to series 763



**Series 763  
M12  
A-Kodierung**

- Circular connector with screw-locking
- Degree of protection IP 67 / IP 68
- Connector moulded on cable
- Cable length 2 m and 5 m (PVC and PUR)
- Shielded and not shielded versions
- Compatible to series 713



**Series 733  
M12  
Push-Pull**

- Push-Pull Verriegelung (Fixconverriegelung)
- Degree of protection IP 67
- Connector moulded on cable
- Cable length 2 m and 5 m (PUR)



**Series 765**  
**Cable**  
**M8 - M8**  
**M12 - M8**  
**M12 - M12**  
**Adapter**

- Connection line cable connectors from series 718 and 763
- Degree of protection IP 65/IP 67/IP 68
- "T/Y" 2-way distributors
- Cable length 1 m and 2 m (PUR)

## Sensor connectors



**Series 766**  
**M12**  
**B-coded**

- Circular connector with screw-locking
- Degree of protection IP 67
- Connector moulded on cable
- Cable length 2 m and 5 m (PVC and PUR)
- Compatible to serie 715



**Series 825**  
**M12**  
**D-coded**

- Circular connector with screw-locking
- Degree of protection IP 67
- shieldable male cable connectors
- transmission features
- for Ethernet applications



**Series 815**  
**M12 / 1/2"**  
**US-coded**

- Circular connector with screw-locking
- Degree of protection IP 67
- Cable assembly possible
- Screw termination



**Series 714**  
**M18**

- Circular connector with screw-locking
- Degree of protection IP 67
- Cable assembly possible
- Screw termination

## BINDER

### Sensor connectors



**Series 715**  
**M12**  
**B-coded**

- Circular connector with screw-locking
- Degree of protection IP 67
- Metal housing with 360° EMC protected shielding
- Cable assembly possible
- Screw termination
- Compatible to series 766 766



**Series 820**  
**7/8" -**  
**16 UN**

- Circular connector with screw-locking
- Degree of protection IP 67
- Schutzleiteranschluss
- Cable assembly possible
- Screw termination



**Series 870**  
**7/8" -**  
**16 UN**

- Circular connector with screw-locking
- Degree of protection IP 68
- Steckverbinder umspritzt am Kabel
- 2m cable length

### Distributors for actors and sensors



**Series 772**  
**Distributors**

- Ready to connect pluggable interface boxes for assembling
- Degree of protection IP 67
- 4,6 or 8 in/outlets for M8 or M12 connectors
- Operation- and Compatible to series zu Serie 707, 713, 763, 765, 623



**Serie 775**  
**AS-I**

- AS-I Interface Distributor
- Degree of protection IP 67
- Flat cable clamps for assembling



## Solenoid valve connectors



### Series M-A

- Connectors according to DIN EN 175301-803
- Degree of protection IP 65 for assembly
- Degree of protection IP 67 moulded-on cable
- Wired versions



### Series M-B

- Connectors according to DIN EN 175301-803
- Degree of protection IP 65 for assembly
- Degree of protection IP 67 moulded-on cable
- Wired versions
- Low housing

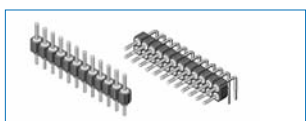


### Series M-C

- Connectors according to DIN EN 175301-803
- Connectors, industrial standard
- Degree of protection IP 65 for assembly
- Degree of protection IP 67 moulded-on cable
- Wired versions

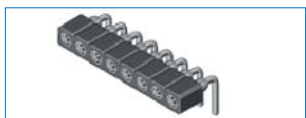
## MPE GARRY

### Precision Pin header / socket terminal strip



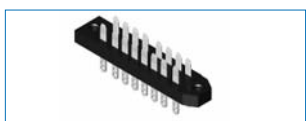
### Pin header

- Grid 1,00, 2,00, 2,54 mm
- Precision, SMD, Press-Fit, Sandwich



### socket terminal strip

- Grid 1,00, 2,00, 2,54 mm
- Solder, pluggable, SMD, Precision



### DIN 41622

- male multipoint connector
- female multipoint connector
- casing



### contact strip Micro T

- Grid: 1,27mm
- Pin: 9, 15, 21 25, 31, 37
- Polarisation: D-Sub

# MOLEX

# Power Connectors

Product Family	Family Description	Product Variations Specifications	Features and Benefits	Applications
	<p><b>Mini-Fit Sr.™</b></p> <p>Molex's Mini-Fit Sr. line is a 10.00 mm (.393") pitch connector handling up to 50.0 A per circuit. This high current system is finding use in applications ranging from computer work stations to power supplies to industrial equipment.</p>	<p>Wire-to-Wire and Wire-to-Board            Single Row: 2 to 6 Circuits            Dual Row: 6 to 14 Circuits            Tin Plating            50.0 A max, 600 V            Crimp Termination            Through-hole            8 to 16 AWG</p>	<ul style="list-style-type: none"> <li>• Four points of electrical contact provide high reliability</li> <li>• TPA (Terminal Position Assurance) piece attached to housing to prevent terminal backouts</li> <li>• Positive latch guards against accidental disengagement of housings</li> <li>• Polarized housing assures proper mating</li> <li>• Metal fork locks for secure retention to PCB</li> </ul>	<ul style="list-style-type: none"> <li>• Powertrain</li> <li>• Safety and Chassis</li> <li>• Business Machines</li> <li>• High-End Computer</li> <li>• Storage</li> <li>• Construction and Mining</li> <li>• Energy and Power</li> <li>• Transportation Equipment</li> <li>• Broadcast Equipment</li> <li>• Telecom</li> <li>• Infrastructure</li> </ul>
	<p><b>Mini-Fit Jr.™</b>  <b>Mini-Fit HCS™</b>  <b>Mini-Fit RTC™</b></p> <p><b>Mini-Fit Jr.</b> is a 4.20 mm (.165") pitch high-current/ high-density power connector offering great design flexibility for wire to-wire and wire-to-board housings. Current carrying capability is up to 9.0 A.</p> <p><b>Mini-Fit HCS</b> (High Current System) is capable of carrying up to 12.0 A per circuit and fits into all existing Mini-Fit housing configurations.</p> <p><b>Mini-Fit RTC</b> is designed with a high-temperature LCP housing, Mini-Fit Reflow Temperature Capable (RTC) Headers can withstand high SMT solder-reflow temperatures to guarantee compatibility with lead-free RoHS reflow processes.</p>	<p>Wire-to-Wire and Wire-to-Board            2–24 Circuit (Dual Row)            3–5 Circuits (Single Row)            Up to 12 A, 600 V Rating            Tin and Gold Plating            Crimp Termination            16–28 AWG            Through-hole, SMC and Press-fit</p>	<ul style="list-style-type: none"> <li>• Fully isolated terminals</li> <li>• Positive housing locks</li> <li>• Four point of contact for reliability</li> <li>• Capable of 12.0 A per circuit with Mini-Fit HCS</li> <li>• Available in UL 94V-2 and UL 94V-0 materials</li> <li>• UL, CSA and</li> </ul>	<ul style="list-style-type: none"> <li>• Security and Alarms</li> <li>• Vending and Gaming</li> <li>• White Goods</li> <li>• Low End Computer</li> <li>• High End Computer</li> <li>• Business Machines</li> <li>• Storage</li> <li>• Data</li> <li>• Computer Peripherals</li> <li>• Energy and Power</li> <li>• Environmental Equipment and Controls</li> <li>• Production Equipment</li> <li>• Broadcast Equipment</li> <li>• Telecom Infrastructure</li> </ul>
	<p><b>Micro-Fit 3.0™</b>  <b>Micro-Fit BMI™</b></p> <p>The <b>Micro-Fit 3.0</b> is a unique connector system that incorporates many of the features previously found only on large power connectors. Variations include dual row, single row and blind-mate (BMI) versions.</p>	<p><b>Micro-Fit 3.0</b></p> <ul style="list-style-type: none"> <li>- Wire-to-Wire and Wire-to-Board Versions</li> <li>- Dual Row: 2 to 24 Circuits</li> <li>- Single Row: 2 to 12 Circuits</li> <li>- Through-hole and SMT</li> </ul> <p><b>Micro-Fit BMI</b></p> <ul style="list-style-type: none"> <li>- Wire-to-Wire, Wire-to-Board, Board-to-Board Versions</li> <li>- Dual Row: 4 to 24 Circuits</li> <li>- Through-hole</li> </ul> <p>Up to 5.0 A, 250 V Rating            Crimp Termination            20 to 30 AWG            UL 94V-0, CSA, TÜV approved</p>	<ul style="list-style-type: none"> <li>• Fully isolated contacts</li> <li>• Full polarization, positive locks (Micro-Fit 3.0)</li> <li>• Four points of contact</li> <li>• BMI Receptacle Floats</li> <li>• Surface Mount Compatible (SMC)</li> <li>• Black, glass filled nylon housings (Micro-Fit BMI)</li> <li>• Black, LCP housings (Micro-Fit 3.0)</li> </ul>	<ul style="list-style-type: none"> <li>• Body Electronics</li> <li>• Comfort and Infotainment</li> <li>• Brown Goods</li> <li>• Medical</li> <li>• Multimedia</li> <li>• Security and Alarms</li> <li>• Vending and Gaming</li> <li>• White Goods</li> <li>• Business Machines</li> <li>• Storage</li> <li>• Environmental Equipment and Controls</li> <li>• Industrial Instruments</li> <li>• Production Equipment</li> <li>• Transportation Equipment</li> </ul>
	<p><b>Sabre™</b></p> <p>The Sabre system is a robust power connector supplying up to 18 amperes for high current applications. The 7.50 mm (.295") pitch system was designed to provide enhanced terminal position assurance to prevent terminal backout in high vibration environments.</p>	<p>Wire-to-Wire and Wire-to-Board            2 to 6 Circuits            18.0 A, 600 V            Tin Plating            Crimp Termination            14 to 18 AWG            Through-hole            UL1950 Finger-proof version available</p>	<ul style="list-style-type: none"> <li>• Patented integral Terminal Position Assurance (TPA) on mated male and female terminals</li> <li>• Fully isolated receptacle towers ensures 1000 V rating</li> <li>• Polarized housings assure proper mating</li> <li>• Positive latch system guards against accidental disengagement of housing</li> </ul>	<ul style="list-style-type: none"> <li>• Vending and Gaming</li> <li>• White Goods</li> <li>• Data (General)</li> <li>• Business Machines</li> <li>• Construction and Mining</li> <li>• Energy and Power</li> <li>• Environmental Equipment and Controls</li> </ul>

# Signal Connectors

# MOLEX

Product Family	Family Description	Product Variations Specifications	Features and Benefits	Applications
 <p><b>PicoBlade™</b></p>	<p>1.25 mm (.049") pitch Wire-to-Board micro connector system is designed for high-density harness applications.</p>	<p>Wire-to-Wire, Wire-to-Board, Board-In 2 to 15 Circuits, Single Row 0.8 to 1.0 A, 125 V Tin Plating Crimp Termination Through-hole, SMT 26 to 32 AWG</p>	<ul style="list-style-type: none"> <li>• Flat blade pins for low mating force</li> <li>• Two points of contact for high reliability</li> <li>• Crimp terminals accept 26 to 32 AWG</li> <li>• Shrouded header with friction locks for good retention</li> <li>• Metal solder tabs provide PCB hold-down and strain relief for SMT tails</li> <li>• Polarized mating geometry</li> </ul>	<ul style="list-style-type: none"> <li>• Brown Goods</li> <li>• Medical</li> <li>• Multimedia</li> <li>• Security and Alarms</li> <li>• Computer Peripherals</li> <li>• Low-End Computer</li> <li>• Environmental Equipment and Controls</li> <li>• Industrial Instruments</li> </ul>
 <p><b>Picoflex®</b></p>	<p>The 1.27 mm (.050") Picoflex IDT Ribbon Cable System offers designers more options for high-density applications where standard discrete wire and flat flexible connectors are not appropriate.</p>	<p>1.27 mm (.050") Ribbon Cable System Wire-to-Board, Board-In 4 to 26 Circuits, Single Row Standard Cable Assemblies 1.2 A, 250 V Tin or 30 μ" Gold Plating IDT Termination Through-hole, SMT 26 or 28 AWG Ribbon Cable</p>	<ul style="list-style-type: none"> <li>• Low mating height (6.40 mm (.252")) provides space savings</li> <li>• One piece design is easier to inventory</li> <li>• Friction lock headers provide excellent retention</li> <li>• Expanded operating temperature range</li> <li>• Standard cable assemblies available</li> <li>• Complete range of application tooling available</li> </ul>	<ul style="list-style-type: none"> <li>• Body Electronics</li> <li>• Comfort and Infotainment</li> <li>• Brown Goods</li> <li>• Medical</li> <li>• Multimedia</li> <li>• Vending and Gaming</li> <li>• Environmental Equipment and Controls</li> <li>• Industrial Instruments</li> <li>• Production Equipment</li> </ul>
 <p><b>Sherloc™</b></p>	<p>2.00 mm (.079") pitch positive lock connector system developed for PC monitor applications. It can also be used for other applications that require space savings and secure locking features</p>	<p>Wire-to-Board, Board-to-Board, Board-In 2 to 20 Circuits, Single Row Positive Lock System Vertical and Right Angle Headers 0.5 to 2.0 A, 125 V Tin Plating Crimp Termination Through-hole 24 to 30 AWG</p>	<ul style="list-style-type: none"> <li>• Low-profile compact design for PCB Space saving</li> <li>• Positive locking ribs provide secure mating retention</li> <li>• Polarizing guide wall prevents mismatching</li> <li>• Low-force terminal for easy insertion and extraction</li> <li>• Box-style contact design provides good mating reliability</li> <li>• Pre-Tin plating gives good solderability and prevents solder-wicking</li> </ul>	<ul style="list-style-type: none"> <li>• Brown Goods</li> <li>• Security and Alarms</li> <li>• Industrial Instruments</li> <li>• Production Equipment</li> </ul>
 <p><b>KK®</b></p>	<p>2.50, 2.54, 3.96 and 5.08 mm (.098, .010, .156 and .200") pitch Wire-to-Board and Board-to-Board interconnect systems.</p>	<p>Wire-to-Board, Board-to-Board Vertical and Right Angle Headers 2.5 to 7 A, 250 V 2 to 36 Circuits, Single Row Tin, 15 μ" Gold, Select Gold Plating Crimp and IDT Termination Through-hole 18 to 30 AWG</p>	<ul style="list-style-type: none"> <li>• Double cantilever terminal design</li> <li>• Polarisation via insertable keys and pegs</li> <li>• Selective gold plating options</li> <li>• End-to-end stacking capabilities</li> <li>• Locking ramp for improved mated retention with locking headers</li> <li>• Accepts KK gas tight crimp terminals</li> <li>• IDT option available</li> </ul>	<ul style="list-style-type: none"> <li>• Comfort and Infotainment</li> <li>• Brown Goods</li> <li>• Security and Alarms</li> <li>• Vending and Gaming</li> <li>• Business Machines</li> <li>• Computer Peripherals</li> <li>• Energy and Power</li> <li>• Industrial Instruments</li> <li>• Production Equipment</li> </ul>

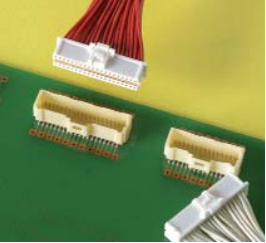
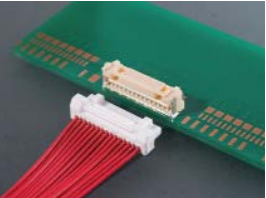
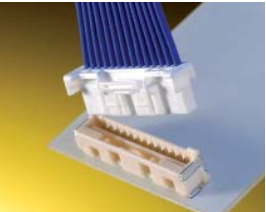

# MOLEX

# Signal Connectors

Product Family	Family Description	Product Variations Specifications	Features and Benefits	Applications
	<b>Milli-Grid™</b> 2.00 mm (.079") pitch. Molex's Milli-Grid family of high-density connectors is based on a 2.00 x 2.00 mm grid pattern.	2.00mm Grid High-Density System Wire-to-Wire, Wire-to-Board, Board-to-Board Dual Row: 4 to 50 Circuits 0.5 to 1.5 A, 125 V Flash, 15 μ", 30 μ" Gold Plating Crimp and IDT Through-hole, SMT 26 to 30 AWG Crimp 28 AWG Ribbon	<ul style="list-style-type: none"> <li>• Designed for 1.00 mm (.039") pitch 28 AWG stranded flat ribbon cable</li> <li>• Offers a 40 % savings in PCB real estate as compared to the standard 2.54 mm (.100") pitch connector system</li> <li>• Optional polarization key and friction locking ramps provide strong retention force to the header</li> <li>• Early entry system terminals for long pin wipe</li> <li>• Strain relief adds greater retention to cablely</li> </ul>	<ul style="list-style-type: none"> <li>• Comfort and Infotainment</li> <li>• Brown Goods</li> <li>• Medical</li> <li>• Multimedia</li> <li>• Security and Alarms</li> <li>• Business Machines</li> <li>• Low-End Computer</li> </ul>
	<b>C-Grid III™</b> 2.54 mm (.100") pitch modular system available in 3 standard platings.	Wire-to-Board, Board-to-Board Single Row: 2 to 32 Circuits Dual Row: 6 to 64 Circuits 3.0 A, 350 V Tin, 15 μ" Gold, 30 μ" Gold Crimp Termination Through-hole and SMT 22 to 28 AWG	<ul style="list-style-type: none"> <li>• Complies with DIN 41651 and HE-13/14</li> <li>• Fully intermateable/interchangeable with Molex QF-50™</li> <li>• Three standard plating options available</li> <li>• Crimp modules are end-to-end stackable</li> <li>• Housings have polarisation and friction locks</li> <li>• Headers with voids and kinked pins available</li> <li>• Fully shrouded headers available to protect pins</li> </ul>	<ul style="list-style-type: none"> <li>• Brown Goods</li> <li>• Security and Alarms</li> <li>• Vending and Gaming</li> <li>• Business Machines</li> <li>• Computer Peripherals</li> <li>• Low-End Computer</li> <li>• Industrial Instruments</li> <li>• Production Equipment</li> </ul>
	<b>QF-50™</b> 1.27 mm (.050") pitch family that features a variety of products conforming to industry-standard styles, such as DIN 41651, MIL-C-83503 keying, HE-10, etc.	1.27 mm (.050") IDT Ribbon Cable system Wire-to-Board Dual Row: 10 to 64 Circuits 1.0 A, 250 V Tin, Flash, 30 μ" Gold Plating IDT Termination Through-hole 26 to 28 AWG	<ul style="list-style-type: none"> <li>• Available with or without polarisation</li> <li>• Complies with DIN 41651, MIL- 83503 keying, HE-10</li> <li>• Selective gold plating options</li> <li>• End-to-end stacking capabilities</li> <li>• Eject lever can be used with or without strain relief, which reduces inventory at end customer</li> <li>• Low profile headers and strain relief available</li> <li>• Headers fully shrouded to protect pins</li> </ul>	<ul style="list-style-type: none"> <li>• Data (General)</li> <li>• Business Machines</li> <li>• Low-End Computer</li> <li>• Industrial Instruments</li> <li>• Production Equipment</li> </ul>
	<b>SPOX™</b> <b>SPOX™ BMI</b> The 2.50 to 7.92 mm (.098 and .312") pitch SPOX (springbox) contact design Wire-to-Board system ensures reliable contact interfaces. The new 2.50 mm SPOX BMI connectors offer self-aligning features in one of the smallest blind-mate packages available.	Wire-to-Board, Board-to-Board 2 to 20 Circuits. (2.50 mm (.098")) 2 to 12 Circuits (3.96 mm (.156")) 2 to 9 Circuits (5.08 mm (.200")) 3 to 5 Circuits (7.92 mm (.312")) 6, 16 Circuit Blindmate (BMI) Versions 4.0 to 7.0 A, 250 V Tin Plating Crimp Termination Through-hole 18 to 28 AWG	<ul style="list-style-type: none"> <li>• Top, side and bottom entry versions enable Board-to-Board solutions</li> <li>• Box design protects contact surface and eliminates 'fish-hooking' issues</li> <li>• Terminals offer 4 points of contact</li> <li>• Locking ramps provide retention to friction lock headers</li> <li>• Ribs provide side-to-side polarisation</li> <li>• Voided version has second circuit blanked for polarisation</li> </ul>	<ul style="list-style-type: none"> <li>• Brown Goods</li> <li>• Security and Alarms</li> <li>• Vending and Gaming</li> <li>• Business Machines</li> <li>• Computer Peripherals</li> <li>• Energy and Power</li> <li>• Industrial Instruments</li> <li>• Production Equipment</li> </ul>

# Signal Connectors

# MOLEX

Product Family	Family Description	Product Variations Specifications	Features and Benefits	Applications
	<p><b>Pico-Clasp™</b></p> <p>The 1.00mm pitch Pico-Clasp system is the smallest available wire-to-board system with positive lock. The small pitch reduces the required PCB real-estate whilst maintaining a high pin count. Pico-Clasp has been developed with a new inner positive lock, offering additional space savings, latch protection, secure retention and audible feedback. The terminal design prevents hooking, offers low insertion and withdrawal forces, and is able to carry up to 1A of current.</p>	<p>Wire-to-Board up to 1A, 50V Crimp Termination 32-28 AWG Single Row Vertical and Right-Angle SMT Headers Double Row Vertical and Right-Angle SMT Headers 2-15 Circuits Single Row 20, 30, 40 Circuits Double Row</p>	<ul style="list-style-type: none"> <li>• Box shape terminal prevents wire hooking</li> <li>• Inner positive lock provides latch protection</li> <li>• Fully shrouded headers protect pins</li> </ul>	<ul style="list-style-type: none"> <li>• Consumer Appliances</li> <li>• Medical Equipment</li> <li>• Multimedia</li> <li>• Vending Machines</li> <li>• Gaming Machines</li> <li>• vPower Supplies</li> <li>• Instrumentation</li> <li>• HVAC Equipment</li> <li>• Security Systems</li> </ul>
	<p><b>1.25mm CLIK-Mate™</b></p> <p>The Molex 1.25mm (.049") pitch SMT CLIK-Mate wire-to-board series has a superior lock design that offers easier use and better mating retention compared to competitive versions. Providing up to 60% space savings when compared to 2.00mm pitch systems, CLIK-Mate 1.25mm was designed for applications that require higher pin count connectors to carry more signal lines in less space.</p>	<p>Wire-to-board up to 1A/50V Crimp termination Vertical and right-angle SMT PCB headers Tin-plated terminals Applicable wire range 26-28 AWG 2 to 15 circuits single row</p>	<ul style="list-style-type: none"> <li>• Robust, dual, inner positive lock (single lock below 8 circuits) ensures secure mating</li> <li>• Dual-contact, U-shaped tuning fork terminal design provides secure electrical contact and avoids terminal stubbing</li> </ul>	<ul style="list-style-type: none"> <li>• Car infotainment</li> <li>• Flat-panel Displays</li> <li>• Ship electronics</li> <li>• Process Controls</li> <li>• Gaming machines</li> <li>• Patient Monitors</li> <li>• Alarm Systems</li> <li>• Set Top Boxes</li> <li>• DVD Players</li> </ul>
	<p><b>2.00mm CLIK-Mate™</b></p> <p>2.00mm (.079") pitch SMT CLIK-Mate wire-to-board series provides dual positive lock for greater mating assurance and reliability. CLIK-Mate 2.00mm was designed for applications that require higher pincount connectors to carry more signal lines in less space.</p>	<p>Wire-to-board up to 3A, 250V Crimp termination Vertical and right-angle SMT PCB headers Tin-plated terminals Applicable wire range 22-26 AWG 4-14 circuits (even) single row</p>	<ul style="list-style-type: none"> <li>• Dual inner positive lock provides secure mating retention</li> <li>• Dual-contact tuning fork (U-shaped) terminal design provides secure electrical contact and avoids terminal stubbing</li> <li>• Large vacuum pick &amp; place areas avoid the requirement for Kapton tape</li> </ul>	<ul style="list-style-type: none"> <li>• Automotive Body</li> <li>• Electronics</li> <li>• Comfort and Infotainment</li> <li>• Brown Goods</li> <li>• Medical equipment</li> <li>• Multimedia</li> <li>• Vending and Gaming</li> <li>• Environmental Equipment and Controls</li> <li>• Industrial Instruments</li> <li>• Production Equipment</li> </ul>
	<p><b>SlimStack™</b></p> <p>SlimStack is the new family name for Molex's broad range of Micro SMT stacking board-to-board connectors. Applications include PDAs, cellular phones, camcorders, notebook PCs and other compact equipment.</p>	<p>SlimStack – 0.40 mm (.016") Pitch - Vertical and Right Angle - Single and Dual Row - 7 to 120 Circuits - 0.95 to 4.00 mm Stack Heights - 50 V, 0.3 A Max SlimStack – 0.50 mm (.020") Pitch - Vertical and Right Angle - 16 to 140 Circuits - 1.50 to 7.00 mm Stack Heights - 50 V, 0.5 A Max SlimStack–0.635 mm (.025") Pitch - Vertical Plug and Receptacles - 20 to 240 Circuits - 3.0 to 16.0 mm Stack Heights - 100 V, 0.5 A Max SlimStack–1.00 mm (.0395") Pitch - Vertical Plugs and Receptacles - 20 to 140 Circuits - 8.0 to 20.0 mm Stack Heights - 100 V, 0.5 A Max</p>	<ul style="list-style-type: none"> <li>• Cantilever-type gold contacts for longterm mating reliability</li> <li>• Metal friction lock for secure mating retention</li> <li>• LCP housing withstands high-temp SMT processes</li> <li>• Shrouded plugs and receptacles have double-wall strength for resistance to shock and vibration</li> <li>• Wide-angled mating surface minimizes risk of damage</li> <li>• Shroud ramp/window locks and contact to plastic locks provide extra retention between plug and receptacle</li> </ul>	<ul style="list-style-type: none"> <li>• Medical</li> <li>• Multimedia</li> <li>• Security and Alarms</li> <li>• Computer Peripherals</li> <li>• Low-End Computer</li> <li>• Mobile Devices</li> <li>• Telecom – Home/Office</li> </ul>

**MOLEX**

**FFC/FPC Connectors**

Product Family	Family Description	Product Variations Specifications	Features and Benefits	Applications
 <p><b>FFC/FPC (SMT)</b></p>	<p>Molex offers a wide variety of ultra low-profile SMT FFC/FPC connectors for tight packaging applications including connectors with actuators on 0.30, 0.50, 0.650, 1.00 and 1.25 mm pitches.</p>	<p>0.30 mm Pitch                      - 11 to 51 Circuits                      - ZIF, Right Angle Versions                      - Easy-On™ Actuators                      - 1.30 to 1.95 mm Mated Height                      - Max 0.2 to 0.3 A                      0.50 mm Pitch                      - 4 to 60 Circuits                      - ZIF and Non-ZIF                      - Vertical + Right Angle Versions                      - Easy-On™, BackFlip™ and Pull Type Actuators                      - 0.90 to 4.05 mm Mated Height                      - Max 0.2 A to 0.5 A                      1.00 mm Pitch                      - 3 to 30 Circuits                      - ZIF and Non-ZIF                      - Vertical + Right Angle Versions                      - Easy-On™, BackFlip™ and Pull Type Actuators                      - 0.90 to 4.05 mm Mated Height                      - Max 0.2 A to 0.5 A</p>	<ul style="list-style-type: none"> <li>• Metal solder tabs provide PCB hold-down and strain relief for SMT tails</li> <li>• Accommodates industry-standard FFC/FPC</li> <li>• Low profile for use in space-sensitive applications</li> <li>• Tuning fork contact for stable, low contact resistance</li> <li>• Packaged in anti-static standard EIA embossed tape and reel</li> <li>• Easy-On™ actuator rotates for easy cable insertion</li> <li>• Contact design includes pre-hold cable feature to help facilitate FPC insertion</li> </ul>	<ul style="list-style-type: none"> <li>• Comfort and Infotainment</li> <li>• Brown Goods</li> <li>• Medical</li> <li>• Multimedia</li> <li>• Security and Alarms</li> <li>• Computer Peripherals</li> <li>• Low-End Computer</li> <li>• Mobile Devices</li> </ul>
 <p><b>FFC/FPC (Throughhole)</b></p>	<p>Molex offers a wide variety of through-hole connectors for flat flexible cable (FFC) and flexible printed circuitry (FPC). Applications include Security, Vending and Gaming Machines.</p>	<p>1.00 mm Pitch                      - 3 to 40 Circuits                      - ZIF and Non-Zif                      - Vertical, Right Angle Versions                      - 3.00 to 6.00 mm Mated Height                      - Max 0.2 to 1.0 A                      1.25 mm Pitch                      - 3 to 40 Circuits                      - ZIF and Non-ZIF                      - Bottom-Entry, Vertical + Right Angle Versions                      - 5.00 to 8.00 mm Mated Height                      - Max 0.5 A to 1.0 A                      2.54 mm Pitch                      - 1 to 27 Circuits                      - ZIF, Non-ZIF, Cable Pierce                      - Vertical + Right Angle Versions                      - 6.50 to 8.80 mm Mated Height                      - Max 0.5 A to 3.0 A</p>	<ul style="list-style-type: none"> <li>• Kinked outer solder tails for PCB retention</li> <li>• For 0.30 mm (.012") thick FFC/FPC</li> <li>• Tuning forks for stable, low contact resistance</li> <li>• Optional cable retention barbs for cable strain relief and full retention of cable</li> <li>• Optional polarizing peg for proper orientation to PCB</li> <li>• Surface Mount Compatible</li> </ul>	<ul style="list-style-type: none"> <li>• Brown Goods</li> <li>• Security and Alarms</li> <li>• Vending and Gaming</li> <li>• Business Machines</li> <li>• Computer Peripherals</li> <li>• Industrial Instruments</li> <li>• Production Equipment</li> </ul>
 <p><b>Premo-Flex™</b></p>	<p>The Molex Premo-Flex Flat Flex Cable jumpers are used to connect 2 PC boards and terminate to either ZIF or non-ZIF FFC connectors.</p>	<p>0.50, 1.00 and 1.25 mm Pitches                      11 Standard Lengths (30 - 305mm)                      Same and Reverse Contact Options                      6 to 50 Circuits                      30 V, 0.5 to 1.2 A</p>	<ul style="list-style-type: none"> <li>• Allow high density wiring solutions</li> <li>• Products are available with custom lengths to meet customer demands</li> <li>• Available with contacting area on same or opposite sides</li> <li>• Can be used in high temperature environment up to 105 °C</li> <li>• Jumpers are very suitable for movable extension of Printed Circuit Boards and/or Displays units etc.</li> <li>• Jumpers are used in applications where the installed cost is important</li> </ul>	<ul style="list-style-type: none"> <li>• Comfort and Infotainment</li> <li>• Brown Goods</li> <li>• Medical</li> <li>• Multimedia</li> <li>• Security and Alarms</li> <li>• Computer Peripherals</li> <li>• Low-End Computer</li> <li>• Mobile Devices</li> </ul>





# I/O Connectors

# MOLEX

Product Family	Family Description	Product Variations Specifications	Features and Benefits	Applications	
	<b>Modular Plugs</b>	<p>Molex plugs offer exceptional performance for voice, data and highspeed networking applications. Plugs are available in standard eight-circuit configurations. Our complete offering of hand and production tools help to make termination easy.</p>	<p>Shielded and Unshielded Category 3, 5, 5e and 6 Short Body RJ11, RJ45 and Industrial Flat Oval and Round Cable</p>	<ul style="list-style-type: none"> <li>• Protective strain relief covers protect wiring</li> <li>• Variety of circuit sizes to meet a variety of application requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Brown Goods</li> <li>• Multimedia</li> <li>• Security and Alarms</li> <li>• Vending and Gaming</li> <li>• Business Machines</li> <li>• Computer Peripherals</li> <li>• Low-End Computer</li> <li>• Industrial Instruments</li> <li>• Medical</li> <li>• Telecom Infrastructure</li> <li>• Networking</li> <li>• Telecom (Home/Office)</li> </ul>
	<b>Right Angle Modular Jacks</b>	<p>Offering the industry's largest product breadth of Right Angle Modular Jacks means that Molex has the right jack for your application. Examples include highspeed jacks with Category 5e performance for networking and Fast Ethernet applications or magnetic jacks featuring integrated magnetics, capacitors and resistors.</p>	<p>RJ-45 (8/10, 8/8, 8/6, 8/4, 8/2 Loaded) RJ-11 (6/6, 6/4, 6/2, 4/4, 4/2 Loaded) Category 3, 5, 5e Versions Single, Dual, Ganged and Stacked Ganged Options Industrial and HyperJack™ Versions Shielded and Unshielded With or Without Lightpipes 2-8 Port Ganged 8-16 Port Stacked Through-hole or SMT</p>	<ul style="list-style-type: none"> <li>• High-speed jacks available that meet NEXT requirements of -40 dB at 100 MHz</li> <li>• Modular jacks with lightpipes reduce electrical noise</li> <li>• SMT modular jacks tape and reel packaging for easy pick-and-place</li> <li>• Low Profile versions allows for tight board stacking</li> <li>• RJ-11 and RJ-45 offerings provide flexibility for a variety of design applications</li> <li>• 50µ" Gold plating option meets FCC 68.5 and is approved for all FCC licensed applications</li> </ul>	<ul style="list-style-type: none"> <li>• Brown Goods</li> <li>• Multimedia</li> <li>• Security and Alarms</li> <li>• Vending and Gaming</li> <li>• Industrial Instruments</li> <li>• Business Machines</li> <li>• Computer Peripherals</li> <li>• Low-End Computer</li> <li>• High-End Computer</li> <li>• Storage</li> <li>• Medical</li> <li>• Telecom Infrastructure</li> <li>• Networking</li> <li>• Telecom (Home/Office)</li> </ul>
	<b>Vertical and Bottom Entry Modular Jacks</b>	<p>Vertical and bottom entry jacks complete the Molex product offering. The high-speed vertical jacks provide Category 5 performance for networking and Fast Ethernet applications. The low profile version is the lowest available in the market. The bottom entry modular jack saves space in PCB designs.</p>	<p>Vertical and Bottom Entry RJ-45 (8/8, 8/6, 8/4, 8/2 Loaded) RJ-11 (6/6, 6/4, 6/2, 4/4, 4/2 Loaded) Category 3, 5 Versions Shielded and Unshielded Low or Standard Profile Through-hole or SMT</p>	<ul style="list-style-type: none"> <li>• High speed jacks 100 % tested to meet NEXT requirements of -40 dB at 100 MHz</li> <li>• SMT vertical mounting enables automatic vacuum placement</li> <li>• SMT process lowers manufacturing costs</li> <li>• Low profile versions allows for tight board stacking</li> <li>• RJ11 and RJ45 offerings provide flexibility for a variety of design applications</li> <li>• 50µ" gold plating option meets FCC 68.5 for all FCC licensed applications</li> </ul>	<ul style="list-style-type: none"> <li>• Brown Goods</li> <li>• Multimedia</li> <li>• Security and Alarms</li> <li>• Vending and Gaming</li> <li>• Industrial Instruments</li> <li>• Business Machines</li> <li>• Computer Peripherals</li> <li>• Low-End Computer</li> <li>• High-End Computer</li> <li>• Storage</li> <li>• Medical</li> <li>• Telecom Infrastructure</li> <li>• Networking</li> <li>• Telecom (Home/Office)</li> </ul>
	<b>RJ45 Industrial Ethernet</b>	<p>RJ-45 Ethernet/IP Cordsets and Receptacles are ideal for use in environments where EtherNet protocol is used, including manufacturing facilities, water treatment plants and transportation hubs. Designed with one sealing surface, the connectors ensure optimum performance even in harsh environments.</p>	<p>Category 5e Wire Plugs PCB Mount Receptacles Panel Mount Receptacles Standard Cable Assemblies</p>	<ul style="list-style-type: none"> <li>• One sealing surface limits the risk of failure</li> <li>• Bayonet style latch receptacle ensures quick and easy connections as well as ensures proper depth when mating</li> <li>• IP 67 and NEMA 6P ratings ensure cordsets are water and dust tight for functional integrity</li> <li>• Category 5e specified for high datatransmission speeds</li> <li>• Overmolded versus field wireable cordsets for faster installation at customer site</li> </ul>	<ul style="list-style-type: none"> <li>• Security and Alarms</li> <li>• Business Machines</li> <li>• High-End Computers</li> <li>• Production Equipment</li> <li>• Instrumentation</li> <li>• Telecom Infrastructure</li> </ul>

# MOLEX

# I/O Connectors

Product Family	Family Description	Product Variations Specifications	Features and Benefits	Applications
 <p><b>USB 2.0</b></p>	<p>Universal Serial Bus (USB) is a low-cost, high performance serial I/O interface for data access and transfer that allows device sharing and seamless integration between computers and an expanding range of peripherals.</p>	<p>USB-A, USB-B, versions Vertical, Right Angle, Stacked and Panel Mount Versions Available Cable Assemblies and Pigtailed in a Variety of Lengths, Versions and Colours Through-hole + SMT Mounting</p>	<ul style="list-style-type: none"> <li>• 480 Mbps data rate, to the USB 2.0 specification</li> <li>• Fully-shielded and polarized plugs</li> <li>• Friction grip on overmolded body facilitates easy mating/unmating</li> <li>• 5 standard cable lengths available</li> <li>• Custom design available for complete cable assemblies</li> </ul>	<ul style="list-style-type: none"> <li>• Low-End Computer</li> <li>• Computer Peripherals</li> <li>• Multimedia</li> <li>• Mobile Devices</li> </ul>
 <p><b>USB On-the-Go</b></p>	<p>Molex's new USB On-The-Go (OTG) connectors and cable assemblies help enable mobile devices such as digital cameras, PDAs, audio players, printers and cellular phones to exchange data directly without the need for a host PC.</p>	<p>Options include mini-A, mini-B and mini-AB Receptacles Vertical and Right Angle SMT and Through-hole Cable Assemblies Available in Standard A-to-mini-B and mini-A-to-mini-B in 1.1 and 2.0 Versions</p>	<ul style="list-style-type: none"> <li>• Compact size for space savings</li> <li>• Operates at speeds up to 480 Mbps</li> <li>• Fully shielded for EMI/RFI protection</li> <li>• 5000 cycles for rugged durability</li> <li>• Full range of standard connectors and cables</li> <li>• Short-body version for space savings</li> </ul>	<ul style="list-style-type: none"> <li>• Mobile Devices</li> <li>• Multimedia</li> </ul>
 <p><b>Micro USB</b></p>	<p>Micro USB allows for further reduction of real estate in portable devices and mobile phones. Micro-USB will replace most of the Mini-USB plugs and receptacles that are currently being used. The specification of the Micro-USB supports the current USB On-The-Go (OTG) supplement, allowing for communication between portable devices without a host.</p>	<p>Top and bottom mount micro-AB receptacles Mid and reverse mount micro-B receptacles Micro-B plug kits Micro-B cable 1A/100VAC 10,000 mating cycles</p>	<ul style="list-style-type: none"> <li>• Highly durable contact design, allowing for 10,000 mating cycles</li> <li>• Latching windows with angular tabs prevent accidental unmating of plug</li> <li>• Stainless steel shell (0.3mm thick) provides high mating durability &amp; strength</li> </ul>	<ul style="list-style-type: none"> <li>• Ultra-Mobile PC</li> <li>• Cell phones</li> <li>• Digital still &amp; video cameras</li> <li>• Multi-media players, PDA's</li> <li>• Industrial hand-held test and measurement</li> <li>• Bar code readers</li> <li>• Medical hand-held devices,</li> <li>• Mobile GPS equipment</li> </ul>
 <p><b>IEEE 1394-1995/ IEEE 1394a-2000</b></p>	<p>IEEE 1394, also named "Firewire" by Apple, and "i.Link" by Sony, is a standard I/O interface designed to service the demands of the emerging multimedia bus requirements. IEEE 1394 is a unique interface for data access and transfer of video and audio with assured quality, based on its high bandwidth capabilities.</p>	<p>Both 6-circuit (IEEE 1394) and 4-circuit (IEEE 1394a) Versions SMT and Through-hole Configurations Upright, Vertical and Rugged Industrial Receptacles Cable Assemblies Available in a Variety of Lengths</p>	<p><u>IEEE 1394-1995</u></p> <ul style="list-style-type: none"> <li>• Six circuits for speeds up to 400 Mbps</li> <li>• Full metal shielding for ESD protection</li> <li>• High-temperature plastic for SMT processing</li> <li>• Cable assemblies in several standard lengths</li> <li>• Rated at 40 V and 1.5 A</li> </ul> <p><u>IEEE 1394a-2000</u></p> <ul style="list-style-type: none"> <li>• Four circuits for speeds up to 400 Mbps</li> <li>• SMT and Through-hole in various mating heights</li> <li>• Full metal shielding for ESD protection</li> <li>• Cable assemblies in three standard lengths</li> <li>• Rated at 5.0 V and 0.5 A</li> </ul>	<ul style="list-style-type: none"> <li>• Mobile Devices</li> <li>• Low-End Computer</li> <li>• Multimedia</li> <li>• Computer Peripherals</li> <li>• Industrial Instruments</li> </ul>



# I/O Connectors

# MOLEX

Product Family	Family Description	Product Variations Specifications	Features and Benefits	Applications
	<p>The MX150L IP67 sealed connector system is designed to meet the needs for a rugged, environmentally sealed connector system supporting both low-level signal and power applications.</p>	<p>Wire-to-Wire, Wire-to-Panel and Wire-to-Board Single and Dual Row 2 to 16 Circuits 18.0 A Max, 300V 14 to 22 AWG Pre-tin or Select Gold Plating Terminal Position Assurance Optional Connector Position Assurance</p>	<ul style="list-style-type: none"> <li>• Single Piece housings contain Seals and TPA components to save applied costs</li> <li>• Simple crimp, poke and plug application avoid the need to crimp individual wire seals reducing applied costs</li> <li>• Integral TPA Locks terminals into housings and prevents terminals from backing out</li> <li>• Integral mating and interface seals are tested to IP 67</li> <li>• Easy terminal extraction and insertion quick, low cost field repairs</li> <li>• Secondary locking latch (CPA) assures positive mating of connector and prevents accidental disengagement</li> </ul>	<ul style="list-style-type: none"> <li>• Transportation</li> <li>• Construction and Mining</li> <li>• Energy and Power</li> <li>• Production Equipment</li> <li>• Environmental Equipment</li> <li>• Security and Alarms</li> <li>• Automotive</li> </ul>
	<p>The SRC connector system was developed to meet the need for a rugged, environmentally sealed connector system, capable of transferring low-level signals as well as higher currents. Featuring high connector and terminal retention forces, SRC outperforms most mature products in the market today. The Terminal Position Assurance feature assures proper locking of the terminals and a protective mat-seal cap protects, securely retains and provides strain relief to the wire seal interface. A single-handed lever lock allows for easy mating and secures the connection between the connectors.</p>	<p>Cable to panel, 84 circuits Male connector on panel Female connector on cable Uses MX150™ terminals in gold or tin-plating, on reel or loose piece Blind cavity plugs are available to close unused circuits 128, 60 circuits and mixed layout versions soon to be released Dust and waterproof according to IEC 60529 IP69K 500VDC/18A (AWG22-14) -40°C - 125°C operating temperature</p>	<ul style="list-style-type: none"> <li>• Integral, two-way mat and interface seals exceeds "waterproof" demands as a true sealed connector system tested under submersed conditions and in various fluids</li> <li>• Pre-assembled connector housing, seals, TPA components and mat seal cap shipped in one piece for reduced applied and inventory cost</li> <li>• Easy terminal insertion and extraction with common tools, reducing applied cost and allowing for easy field repair</li> </ul>	<ul style="list-style-type: none"> <li>• Agriculture equipment</li> <li>• Construction equipment</li> <li>• Recreational vehicles</li> <li>• Marine equipment</li> <li>• Commercial vehicles</li> </ul>
	<p>The XRC IP67 sealed circular connector was developed to meet the demanding requirements of the heavy equipment industry. For maximum design flexibility, the standard shell size 18 XRC plugs and receptacles are available in standard and reverse gender and can be used in cable-to-panel and cable-to-cable configurations.</p>	<p>Shell size 18 plugs and receptacles with both socket and pin inserts Uses 14 size 16 contacts with wire range 14-18 and 16-18AWG Hexagonal nut available for mounting the receptacle onto a panel Blind cavity plugs are available to close unused circuits Other insert arrangements to be released soon</p>	<ul style="list-style-type: none"> <li>• Sealed against the ingress of dust, water and other contaminants according to IEC 60529 IP67</li> <li>• Standard and reverse terminal genders allow for custom polarization and design flexibility</li> <li>• Bayonet-style latch allows for quick installation and provides mating assurance and reliability</li> <li>• Seal retainer lip is compatible with backshell and overmolding applications</li> </ul>	<ul style="list-style-type: none"> <li>• Tractors and other agricultural equipment</li> <li>• Transportation</li> <li>• Recreational vehicles</li> <li>• Material handling equipment</li> <li>• Construction vehicles</li> </ul>

# JST

## Wire to Board Crimp Connectors



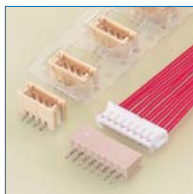
**RM 1.0  
Serie SH**

Grid: 1,00 mm  
 Number of positions: 2 - 20 pol.  
 Operating current: 1 A (AWG 28)  
 Wire: AWG 28 - 32  
 Nominal voltage: 50 V



**RM 1.25  
Serie GH**

Grid: 1,25 mm  
 Number of positions: 2 - 15 pol.  
 Operating current: 1 A (AWG 26)  
 Wire: AWG 26 - 30  
 Nominal voltage: 50 V



**RM 1.5  
Serie ZH**

Grid: 1,50 mm  
 Number of positions: 2 - 13 pol.  
 Operating current: 1 A (AWG 26)  
 Wire: AWG 26 - 32  
 Nominal voltage: 50 V



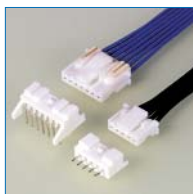
**RM 2.0  
Serie PH**

Grid: 2,00 mm  
 Number of positions: 2 - 16 pol.  
 Operating current: 2 A (AWG 24)  
 Wire: AWG 24 - 32  
 Nominal voltage: 100 V



**RM 2.0  
Serie PHD  
double-row**

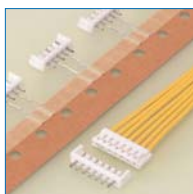
Grid: 2,00 mm  
 Number of positions: 8 - 34 pol.  
 Operating current: 3 A (AWG 22)  
 Wire: AWG 22 - 28  
 Nominal voltage: 250 V



**RM 2.0  
Serie PA**

Family in variations  
 available (IDC/wtw)

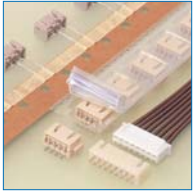
Grid: 2,00 mm  
 Number of positions: 2 - 16 pol.  
 Operating current: 3 A (AWG 22)  
 Wire: AWG 22 - 28  
 Nominal voltage: 250 V



**RM 2.5  
Serie EH**

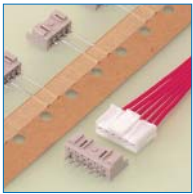
Grid: 2,50 mm  
 Number of positions: 2 - 15 pol.  
 Operating current: 3 A (AWG 22)  
 Wire: AWG 22 - 32  
 Nominal voltage: 250 V

## Wire to Board Crimp Connectors



**RM 2.5  
Serie XH**

Grid: 2,50 mm  
Number of positions: 1 - 20 pol.  
Operating current: 3 A (AWG 22)  
Wire: AWG 22 - 30  
Nominal voltage: 250 V



**RM 2.5  
Serie XA**

Grid: 2,50 mm  
Number of positions: 2 - 20 pol.  
Operating current: 3 A (AWG 20/22)  
Wire: AWG 20 - 28  
Nominal voltage: 250 V



**RM 3.96  
Serie VH**

Grid: 3,96 mm  
Number of positions: 2 - 11 pol.  
Operating current: 10 A (AWG 16)  
Wire: AWG 16 - 22  
Nominal voltage: 250 V

## Wire to Board IDC Connectors



**RM 0.8  
Serie SUR**

Grid: 0,80 mm  
Number of positions: 2 - 22 pol.  
Operating current: 0,5 A (AWG 32)  
Wire: AWG 32 + 36  
Nominal voltage: 30 V



**RM 1.5  
Serie ZR**

Grid: 1,50 mm  
Number of positions: 2 - 13 pol.  
Operating current: 0,7 A  
Wire: AWG 28  
Nominal voltage: 50 V



**RM 2.0  
Serie KR**

Grid: 2,00 mm  
Number of positions: 2 - 16 pol.  
Operating current: 1 A  
Wire: AWG 26  
Nominal voltage: 100 V

# JST

## Film connectors



**RM 0.5**  
**Serie FLZ**  
**ZIF**

Grid: 0,50 mm  
Number of positions: 6 - 50 pol.  
Operating current: 0,5 A  
Nominal voltage: 50 V



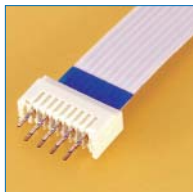
**RM 1.0**  
**Serie FMZ**  
**ZIF**

Grid: 1,00 mm  
Number of positions: 6 - 30 pol.  
Operating current: 0,5 A  
Nominal voltage: 50 V



**RM 1.0**  
**Serie FMN**  
**non-ZIF**

Grid: 1,00 mm  
Number of positions: 4 - 40 pol.  
Operating current: 0,5 A  
Nominal voltage: 50 V



**RM 1.25**  
**Serie FE**  
**non-ZIF**

Grid: 1,25 mm  
Number of positions: 4 - 40 pol.  
Operating current: 1 A  
Nominal voltage: 200 V

## JFA Connector System Wire to Board / Wire to Wire



**RM 2.5**  
**single-row**  
**double-row**  
**Serie J2000**

Grid: 2,50 mm  
Number of positions: 3+4  
Number of positions: 6-20  
Operating current: 4,60 A / 3 pol. (AWG 20)  
Wire: AWG 28 - 20  
Nominal voltage: 250 V



**RM 3.81**  
**single-row**  
**double-row**  
**Serie J300**

Grid: 3,81 mm  
Number of positions: 3 - 10 pol.  
Number of positions: 6 - 20 pol.  
Operating current: 15 A (single/AWG 14)  
Wire: AWG 28 - 14  
Nominal voltage: 250 V

**RM 5.08**  
**single-row**  
**double-row**  
**Serie J300**

Grid: 5,08 mm  
Number of positions: 1 - 6 pol.  
Number of positions: 6 - 20 pol.  
Operating current: 15 A (single/AWG 14)  
Wire: AWG 28 - 14  
Nominal voltage: 600 V

## Waterproof connectors



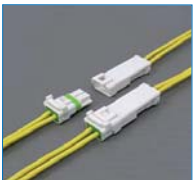
**RM 2.0**  
**Serie JWPF**  
**WtW**

Grid: 2.0 mm  
Number of positions: 2-8 pol.  
Operating current: 3 A (AWG 22)  
Wire: AWG 26-22  
Nominal voltage: 100V



**RM 2.0**  
**Serie JWPF**  
**WtB**

Grid: 2.0 mm  
Number of positions: 2-4 pol.  
Operating current: 3 A (AWG 22)  
Wire : AWG 26-22  
Nominal voltage: 100V



**RM 5.0**  
**Serie WPJ**  
**WtW**

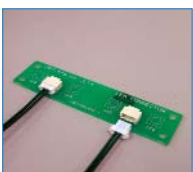
Grid: 5.0 mm  
Number of positions: 2+3 pol.  
Operating current: 7 A (AWG 18)  
Wire : AWG 22-18  
Nominal voltage: 300V



**RM 5.0**  
**Serie WPJ**  
**WtB**

Grid: 5.0 mm  
Number of positions: 2+3 pol.  
Operating current: 7 A (AWG 18)  
Wire : AWG 22-18  
Nominal voltage: 300V

## Connectors LED applications



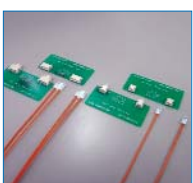
**RM 1.8**  
**Serie LEA**  
**WtB**

Grid: 1.8 mm  
Number of positions: 2 pol.  
Operating current: 3 A (AWG 22)  
Wire : AWG 30-22  
Nominal voltage: 300V



**RM 1.8**  
**Serie SFH**  
**WtB**

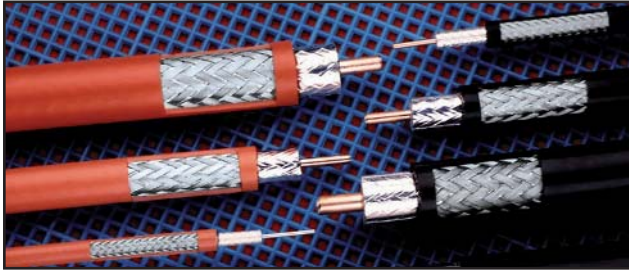
Grid: 1.8 mm  
Number of positions: 2 pol.  
Operating current: 4 A (AWG 22/24)  
Wire : AWG 30-22  
Nominal voltage: 350V



**RM 4.0**  
**Serie LEB**  
**WtB + BtB**

Grid: 4.0 mm  
Number of positions: 1+2 pol.  
Operating current: 3 A (AWG 22)  
Wire : AWG 26-22  
Nominal voltage: 300V

## LMR® Cable



LMR® from Times Microwave Systems is the industry standard for flexible, low-loss coaxial cable.

Applications for flexible low loss coax are countless. While some manufacturers try to fit the application to a limited product selection, Times Microwave Systems offers the broadest range of sizes (LMR-100 to LMR-1700) and varieties to match the environmental and handling requirements of the application



LMR® Cable is designed for outdoor use and has a UV resistant black polyethylene jacket. The bending/ handling characteristics are significantly better than air-dielectric and corrugated hardline cables.



TCOM® Cable is a low loss flexible 50 Ohm coax with low passive intermod and better flexing performance than LMR cable.



LMR-Lite® cables use an aluminum braid that reduces weight and cost.



T-RAD® Leaky Feeder Cables provide coverage in buildings, mines, tunnels and other enclosed areas.



LMR®-FR is a non-halogen, low smoke, fire retardant cable with a UL/NEC rating of 'CMR'.



LMR®-DB is designed for outdoor use. A flooding compound in the braid makes it completely water-tight.



LMR®-UltraFlex employs a stranded center conductor and highly flexible outer jacket for enhanced flexibility.



LMR®-LLPL is a highly fire retardant cable suitable for runs within air handling plenums (drop ceilings, raised floors). It has a UL/NEC rating of 'CMP'.



LMR®-75 cable is a 75 Ohm version of LMR cable.



LMR®-Bundled Cable is a spiral configuration of multiple LMR®-400 or smaller LMR® cables under a common polyethylene outer jacket.

# LMR Connectors

# TIMES Microwave Systems

## LMR® Connectors



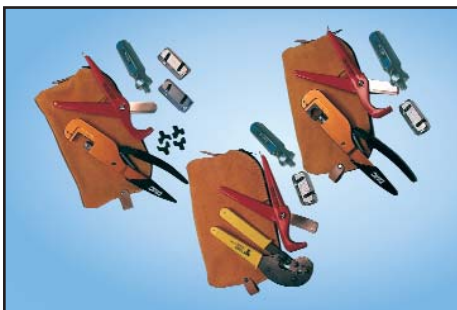
An extensive selection of LMR® connectors with crimp or clamp outer conductor attachment, and solder or non-solder 'EZ' center pins are available. All common interfaces (N, TNC, BNC, SMA, UHF, 7/16DIN and more) are supported. Times' Advantage™ series connectors are world-renowned for their quality and reliability



The Times-Protect™ line of innovative RF lightning protection products addresses applications throughout the entire useful RF frequency range from DC through 6GHz. Among the most noteworthy features are:

- High surge current ratings and multi-strike capability
- Lowest voltage and energy throughput ratings
- Solid brass construction & weatherized housings

## LMR® Installation Tools and accessoires



Times offers a complete line of easy to-use cable prep and installation tools.



A full line of supporting hardware including ground kits, hoist grips, snap-in hangers, support blocks, entry panels and weatherproofing kits is available.



## SilverLine™ Test Cables



SilverLine™, SilverLine™ 40 GHz & SilverLine™-PT Phase Stable Test Cables offer reliability and high performance for a wide variety of test applications.

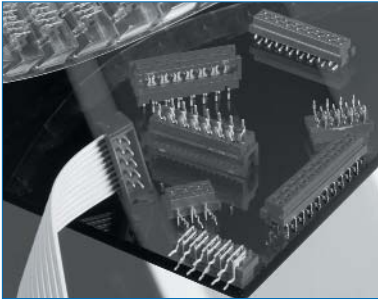


SilverLine™ -QMA test cables offer fast, reliable and repeatable RF test measurements for portable and mobile radios.



SilverLine™ TuffGrip and SilverLine™-CI Changeable Interface robust test cables address the field environment test needs of the cellular infrastructure market.

## AMP TYCO / CONEC



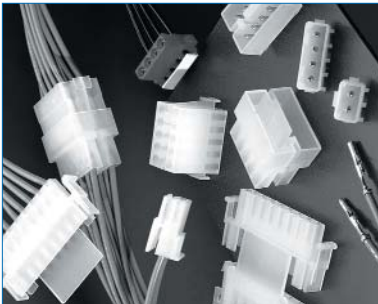
### AMP Micro-MaTch Miniature connector systems

Grid:	1,27 mm
Number of poles:	4 - 20 pol.
Operating Current:	1,5 A
Nominal voltage:	100 V



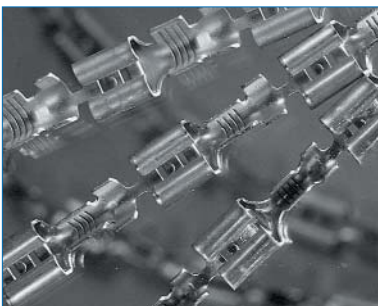
### AMPMODU connector systems

Grid :	2,54 mm
Number of poles:	div.
Operating Current:	3,0 A
Nominal voltage:	750 - 1000 V



### AMP Universal MATE-N-LOK Multi-connectors

Number of poles:	1 - 9 pol.
Operating Current:	max. 17 A
Nominal voltage:	600 V



### AMP Faston / Fastin attachable sleeves

Plug sleeves:	2,8 / 4,8 / 6,3 mm
flat connection:	2,8 / 4,8 / 6,3 mm
insulating sleeves:	2,8 / 6,3 mm
multipolar:	1 - 8 pol.



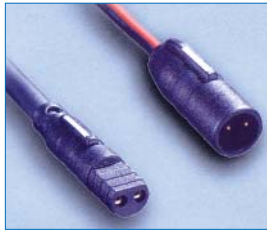
### CONEC

- D-Sub Connectors
- D-Sub Filter Connectors
- D-Sub High Density Connectors
- D-Sub Steckverbinder for flat cable / crimping
- Water proof D-Sub Connectors
- Plastic and metal casing for D-Sub Connectors
- D-Sub Accessoires
- DIN 41617 / 41612 Connectors



# Connectors SK-Series (IP 68) / NEUTRIK

## Small molded circular connectors IP 68



**SK 2**

Protection: IP 68  
 Operating Current: max. 5 A  
 Nominal voltage: 30 V AC, 42,5 V DC  
 Contacts: 30 mu gold over nickel  
 number of poles: 2  
 Temperature: - 10°C to + 80°C  
 Cable: single wire, dual wire  
 Round cable, double insulated



**SK 2-PCB**

Protection: IP 68  
 Operating Current: max. 5 A  
 Nominal voltage: 30 V AC, 42,5 V DC  
 Contacts: 30 mu gold over nickel  
 number of poles: 2  
 Temperature: - 10°C to + 80°C



**SK 4  
moulded on  
cable**

Protection: IP 68  
 Operating Current: max. 5 A  
 Nominal voltage: 30 V AC, 42,5 V DC  
 Contacts: 30 mu gold over nickel  
 number of poles: 4  
 Temperature: - 10°C to + 80°C  
 Cable: Round cable, double insulated



**SK 5  
moulded on  
cable**

Protection: IP 68  
 Operating Current: max. 5 A  
 Nominal voltage: 30 V AC, 42,5 V DC  
 Contacts: 30 mu gold over nickel  
 number of poles: 5  
 Temperature: - 10°C to + 80°C  
 Cable: Round cable, double insulated

## NEUTRIK



- Professional connectors for audio and video technology
- XLR connectors
- Profi-Cinch connectors
- Phone jack and adapter

# ODU

## Modular Attachable Connectors



### ODU MAC

- ❑ Signal, power, high power, fiber optics, pneumatic, fluid and BUS modules
- ❑ High connector density
- ❑ Extremely high number of mating cycles (> 100,000)
- ❑ Vibration protection
- ❑ Available in DIN housing with locking spindle and locking latch
- ❑ Docking frame and version in DIN housing available



### ODU MAC LC

- ❑ Diverse contact inserts (modules) for signals, power and high frequency are available
- ❑ 4 frame sizes (12/18/26/37 units)
- ❑ Up to 5,000 mating cycles
- ❑ Easy assembly and removal of the contacts using clip technology
- ❑ Frame can be mounted in standard DIN housing with spindle- and lever locking

## Cylindrical connectors



### ODU Single contacts round and flat

- ❑ Very high number of contact surfaces
- ❑ Separately mountable spring wires
- ❑ Flat springwire socket
- ❑ Up to 100,000 mating cycles



### ODU Mini-Snap

- ❑ Cylindrical connectors made of metal
- ❑ Push-pull lock
- ❑ 5 series
- ❑ 2 to 40 contact positions
- ❑ P 50 and IP 68



### ODU MINI-SNAP PC

- ❑ Cylindrical connectors made of plastic
- ❑ Push-pull lock FP
- ❑ FP locking principle
- ❑ 3 sizes
- ❑ 2 - 27 contact position



### ODU MEDI-SNAP

- ❑ Cylindrical connectors made of plastic
- ❑ Push-pull lock
- ❑ LP locking principle
- ❑ 2 - 14 contact positions
- ❑ 6 color-coding options

# Screw connections / WAGO / JOWO / LAPP-KABEL (Contact)



## LAPP-KABEL

### Industrial connectors EPIC®

- When we talk about secure connections, you can take us at our word. EPIC® industrial connectors produce an absolutely secure connection in combination with ÖLFLEX® cables. We provide the right contact for all your needs: From rectangular or circular connectors, to housings, inserts, contacts and accessories, bus or fibre optic cable applications.



## JOWO system technology

### Serie 8819

- Push-Pull underwater connector
- Service pressure (unmated connectors) 30 bar
- Number of contacts: 4 and 7



### Serie 8811 ADF

- To be used in mines and explosive rooms
- Satisfies the EC Directive 94/01/CE (ATEX 100a)
- Can be used in water depths down to 1000 meters



## WAGO Innovative connectors

- PCB terminal
- Lead-through terminal
- PCB connectors
- X-Com R / WINSTA R PCB connectors
- Connectors for special applications



## Screw connections

- Metal, EMV and plastic
- in PG, metric



**Switches /  
Position switches**

- Miniatur limit switches, Plastic
- Limit switches, Plastic
- Limit switches, Metal



**Switches**

- with separate actuator, Metal/Plastic
- Interlocking switches
- Switches for hinged applications
- Position switches for explosive environments



**Foot switches**

- With or without protective hood, IP66/IP67
- Foot operator terminal FBT
- Medical foot operator



**Inductive sensors**

- Microsensors Ø3/Ø4/Ø6,5 / M4/M5x0,5
- Metric sensors M8/M12/M18/M30x1
- Rectangular housings, Metal/Plastic
- Namur sensors IP67



**Capacitive sensors**

- Metric sensors M12/M18x1, M30/M32x1,5
- Cylindrical housings, Ø 20/34 mm
- Rectangular housings, Plastic



**Photoelectric sensors**

- Metric sensors M12/M18x1, M30x1,5
- Rectangular housings, Metal 12x12x55
- Rectangular housings, Plastic 88x63x24
- Cylindrical housings, Ø20 mm



**Industrial enclosures**

- Aluminium Enclosure, Type CA
- Polycarbonate Enclosure, Type CT
- ABS Enclosure, Type CT
- Polyester Enclosure, Type CP

## Cable and Wire



### Megaflex®

- ❑ Halogen-free
- ❑ Highly flame-retardant
- ❑ Resistant to oils, greases, UV and weathering
- ❑ Especially well-suited for use in public buildings, such as airports and train stations, where personal injuries and subsequent damage must be prevented in the event of a fire.



### Heluwind®

- ❑ specifically designed for use in wind turbines
- ❑ Temperature range -50°C to +145°C
- ❑ UV-resistant, RoHS conformity
- ❑ The product conforms to the EC low-voltage directive 73/23EEC or 93/68EEC



### Helusound®

- ❑ For the highest standards in the audio range
- ❑ Superfine strands
- ❑ Extremely soft PVC jacket mixture
- ❑ Ideal for mobile use



### Helulight®

- ❑ Use: Light control via DMX

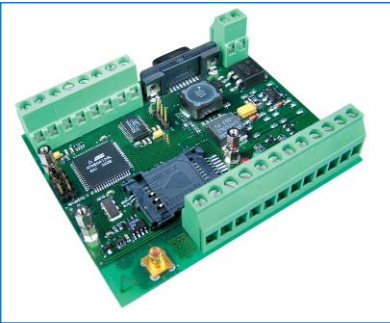


### Thermflex®

- ❑ Heat-resistant, abrasion-resistant silicone hose
- ❑ Temperature range 60 °C to +180 °C
- ❑ Shielded and unshielded versions available
- ❑ As FRNC also with difficulty inflammable/ do not corroded

# Components and systems made by MC Technologies

## MC Technologies Components and systems



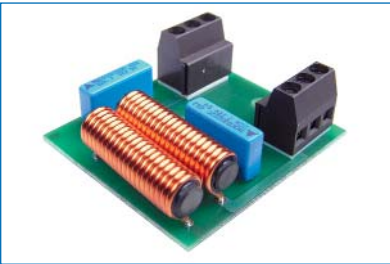
We develop and manufacture components and complete systems according to your requirements. Our highly qualified team of specialists in analogue and digital technology are available to help.

For MC Technologies the close partnership with its customers is only natural. That's why we have developed from a supplier to a system partner.

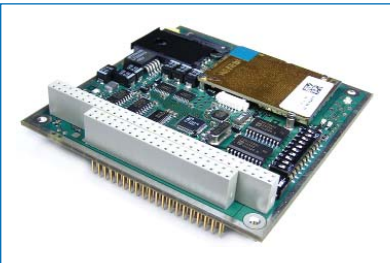
### How you benefit from our services:

- Circuit diagram creation
- PCB routing
- Mechanical components
- Complete development
- Complete assembly
- Tool manufacture

### System solutions components



**Product:**  
Motor elimination filter  
**Area of use:**  
small-power motor



**Product:**  
GSM PC104 card  
**Area of use:**  
Automotive board computer



**Product:**  
Modem Controller  
**Area of use:**  
Data transmission



**Product:**  
GSM PCB board  
**Area of use:**  
Telematics, telemetry

### References

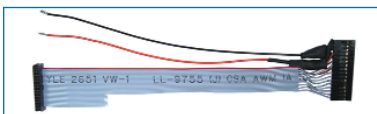
#### Components/Cable manufacture



# Cable manufacture - made by MC Technologies



**Product:**  
Water pump control  
**Area of use:**  
Water pump



**Product:**  
Connecting cable  
**Area of use:**  
Control system construction



**Product:**  
Pressure sensors  
**Area of use:**  
Engineering



**Product:**  
Valve control  
**Area of use:**  
Commercial vehicle building



**Product:**  
Car seat controller  
**Area of use:**  
Forklift



**Product:**  
Light barrier distributor  
**Area of use:**  
Locking devices



**Product:**  
ASI-Bus  
**Area of use:**  
Distributor for small devices

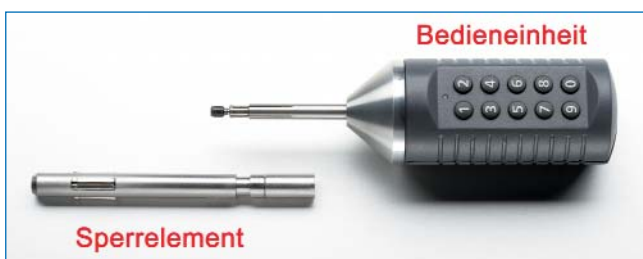
## Cable manufacture

### Professional connections

- Round connectors**  
Crimped and soldered versions also pointed
- Crimping technology**  
We can assimilate all contacts for you from Molex, JST, AMP and others
- Flexible flat conductors**  
Crosscut and strengthened for use with ZIF and non-ZIF connectors RM 0.5 ... 2,54 mm
- Ribbon cable systems**  
Grid dimensions 1.27 and 0.635 in clamping plate technology
- Special wire harness**  
Construction and manufacture of customer-specific cables and LWL cable fittings.



**Product:**  
Harness control system  
**Area of use:**  
Industrial Robotics



### Special connectors for High-tech security

- 2 pin
- with high mating cycles

*We develop connectors according to customer requirements with appropriate number of items*

# Solar cable for thin film modules

## Solar stub cable for the simple assembly of thin film modules



This not only saves considerable amounts of cable, but also an enormous amount of work in the installation of equipment, connecting the modules and laying the pipes.

In addition to costs for the installation also reduces the cost of inspections, maintenance and possible fixes.

Our solar cables are packed in your desired length, number and spacing, and with solar connectors of all established manufacturers.

We are happy to produce according to your individual designs. The cables are produced at short notice in Hannover.



### Benefits for our customers:

- Best quality direct from the manufacturer
- Complete assembly
- Fast service and support
- Individual solutions

## HELUKABEL® - Cables & Wires SOLARFLEX®

Certified and specialized single-core cables for the cabling of solar modules. High graded UV- and weather resistance combined with many years of production and operation experience assure a long-lasting service life.

The **SOLARFLEX®-X PV1-F** is used for the cabling between interconnected solar modules.

Art.-No.	Number of cores x Nominal mm <sup>2</sup>	External Ø approx. mm	Cu-number kg/km	Weight approx. kg/km	Core / shell color
704225	1 x 2,5	4,5	24,0	55	Natural / Black
704226	1 x 4	5,2	38,4	85	Natural / Black
704227	1 x 6	5,9	57,6	95	Natural / Black
704228	1 x 10	6,9	96,0	110	Natural / Black
704229	1 x 16	8,3	153,6	170	Natural / Black
704230	1 x 25	10,0	240,0	295	Natural / Black
704231	1 x 35	11,0	336,0	395	Natural / Black
704232	1 x 50	13,0	480,0	630	Natural / Black
704233	1 x 70	15,3	672,0	850	Natural / Black
704234	1 x 95	17,0	912,0	1200	Natural / Black

### Technical Data:

- Temperatur range: -40°C to +90°C, max.Temp. at conductor +120°C
- Nominal voltage according to VDE 600/1000V AC 1800V DC conductor/conductor
- AC test voltage 50 Hz, 4000 V
- Minimum bending radius for fixed installation approx. 4 cable Ø

### Cable structure:

- bare copper, tinned, finely stranded according to DIN VDE 0295 class 5 and IEC 60228 cl. 5
- double-insulated
- insulation cross-linked special compound
- sheath colour black

### Properties:

- approval: VDE and TÜV
- UV, ozone, weather and hydrolysis-resistant
- very good resistance to oils and chemicals
- flame-resistant according to VDE 0482-332-2, DIN EN 60332-1
- very robust and abrasion-resistant sheath
- resistant to short-circuits up to 200°C thanks to their double insulation; short-circuits temperature 200°C/5 sec
- anticipated service life - 25 years
- RoHS conformity



# Connector system for photovoltaic

# Multi-Contact

## Ø 4mm Connector system for photovoltaic



Photovoltaic connector system MC4 with locking system and safety clip that requires a tool to unlock. Designed for time-saving, dependable series cabling of solar panels, free-standing or integrated into buildings. Allows for quick and easy assembly, either at the factory or on-site by the contractor. Helps reduce installation costs considerably. Now also available for Ø10mm cables.

### PV-Male cable coupler PV-KST4...-UR

PV-KST4...-UR



#### Male cable coupler as individual part (including insulating part)

Typ	Order No.	B mm	A <sup>1)</sup> mm	<sup>2)</sup> mm <sup>2</sup>	AWG
PV-KST4/2,5I-UR	32.0011P0001-UR	3	3 – 6	1,5 – 2,5	14
PV-KST4/2,5II-UR	32.0013P0001-UR	3	5,5 – 9	1,5 – 2,5	14
PV-KST4/6I-UR	32.0015P0001-UR	5	3 – 6	4 – 6	12 / 10
PV-KST4/6II-UR	32.0017P0001-UR	5	5,5 – 9	4 – 6	12 / 10

<sup>1)</sup> Ø-range of cable gland

<sup>2)</sup> Conductor cross section

#### Male cable coupler on carrier band

(on reels of 2000 pieces including insulating parts)

Typ	Order No.	B mm	A <sup>1)</sup> mm	<sup>2)</sup> mm <sup>2</sup>	AWG
PV-KST4/2,5I-UR	32.0011P2000-UR	3	3 – 6	1,5 – 2,5	14
PV-KST4/2,5II-UR	32.0013P2000-UR	3	5,5 – 9	1,5 – 2,5	14
PV-KST4/6I-UR	32.0015P2000-UR	5	3 – 6	4 – 6	12 / 10
PV-KST4/6II-UR	32.0017P2000-UR	5	5,5 – 9	4 – 6	12 / 10

<sup>1)</sup> Ø-range of cable gland

<sup>2)</sup> Conductor cross section

### Female cable coupler PV-KBT4...-UR

PV-KBT4...-UR



#### Female cable coupler as individual part (including insulating part)

Typ	Order No.	B mm	A <sup>1)</sup> mm	<sup>2)</sup> mm <sup>2</sup>	AWG
PV-KBT4/2,5I-UR	32.0010P0001-UR	3	3 – 6	1,5 – 2,5	14
PV-KBT4/2,5II-UR	32.0012P0001-UR	3	5,5 – 9	1,5 – 2,5	14
PV-KBT4/6I-UR	32.0014P0001-UR	5	3 – 6	4 – 6	12 / 10
PV-KBT4/6II-UR	32.0016P0001-UR	5	5,5 – 9	4 – 6	12 / 10

<sup>1)</sup> Ø-range of cable gland

<sup>2)</sup> Conductor cross section

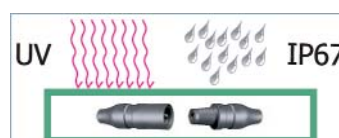
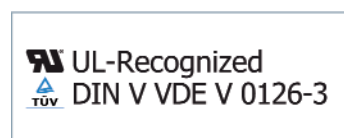
#### Female cable coupler on carrier band

(on reels of 2000 pieces including insulating parts)

Typ	Order No.	B mm	A <sup>1)</sup> mm	<sup>2)</sup> mm <sup>2</sup>	AWG
PV-KBT4/2,5I-UR	32.0010P2000-UR	3	3 – 6	1,5 – 2,5	14
PV-KBT4/2,5II-UR	32.0012P2000-UR	3	5,5 – 9	1,5 – 2,5	14
PV-KBT4/6I-UR	32.0014P2000-UR	5	3 – 6	4 – 6	12 / 10
PV-KBT4/6II-UR	32.0016P2000-UR	5	5,5 – 9	4 – 6	12 / 10

<sup>1)</sup> Ø-range of cable gland

<sup>2)</sup> Conductor cross section



**NEW PROFITEST PV - for Photovoltaic Systems**



Using the sun as a revenue generator is not only clever, it can also be profitable!

In keeping with the motto,

"connect - switch on - start measurement - read results - done", GOSSEN METRAWATT is introducing a peak power and characteristic curve measuring instrument to the market, namely the PROFITEST PV.

The field of photovoltaic has experienced rapid development since its beginnings in recent years. Insight and growing knowledge regarding the finite nature of fossil fuels and nuclear energy sources, as well as their consequences for the environment, have reawakened interest in solar technology.

The PROFITEST PV provides a peak power and characteristic curve measuring instrument for photovoltaic systems with auto-ranging up to 1000 V / 20 A.

The PROFITEST-PV allows for the measurement of characteristic I U curves, as well as individual photovoltaic modules and strings. With the help of a patented process, the instrument is capable of ascertaining peak power, series resistance and parallel resistance directly on-site "with only one measurement and without entering module data", which are then indicated at a high resolution, color graphic touch-screen which is suitable for use in sunlight.

Troubleshooting in PV systems, as well as documentation of system quality, are executed quickly and economically during initial start-up and subsequent testing without a long learning curve. This simple yet decisive test assures safety for the customer and eliminates consequential costs for the installer. Measured peak power can, for example, also be used in order to determine peak ratio. Beyond this, acquired characteristic curves make it possible to draw further conclusions regarding the electrical characteristics of the measured module or string. And thus the tester is also suitable for use in research and development.

**Outstanding features of the PROFITEST PV:**

- ❑ Uniform measurement of the characteristic I-U curve at capacitive loads and strings
- ❑ Measurement of short-circuit current  $I_{sc}$ , open circuit voltage  $U_{oc}$ , instantaneous peak power of a solar cell  $P_{max}$ , series resistance  $R_s$  and internal parallel resistance  $R_p$
- ❑ Displayed (calculated) values: peak power  $PP_k$ , internal series resistance  $R_S$ , internal parallel resistance  $R_P$ , instantaneous values:  $UP_{max}$ ,  $IP_{max}$ ,  $P_{max}$ ,  $U_{OC}$ ,  $I_{SC}$ ,  $FF$ ,  $T_{mod}$ ,  $T_{ref}$ ,  $ETRMS$ , characteristic I-U curve diagram
- ❑ Automatic conversion of momentary measured values to STC (standard test conditions)
- ❑ Generator voltages up to 1000 V DC, current up to 20 A DC, power up to 2 kW
- ❑ Power and temperature measurement via four-conductor cable for error-free results
- ❑ Patented calculation process for evaluating PV generators without knowledge of the manufacturer's specifications
- ❑ Patented calculation process for determining the generator's internal series resistance based solely on a measured characteristic I-U curve
- ❑ Internal data memory for up to several thousand measurements
- ❑ Continuous display of momentary irradiation and temperature provides information regarding measuring conditions
- ❑ Separate measurement of temperatures at the irradiation sensor and the back of the module (Pt100) for increased measuring accuracy
- ❑ Universal input for use with commercially available irradiation reference sensors, assuring trouble-free on-site use of adapted sensors and sensor replacement
- ❑ Operation via a PC with direct import of measurements is also possible (e.g. for long-term measurements)
- ❑ External power pack with broad-range input for charging the batteries, and for continuous operation of the measuring instrument
- ❑ Open interfaces allow for operation of the instrument in special applications as well.
- ❑ High level of intrinsic safety thanks to included load disconnecter (1000 V / 32 A DC) for all-pole disconnection of the measuring instrument from the PV generator
- ❑ Calibrated irradiation sensor in accordance with IEC / EN 60904-2, VDE 0126-4-2 with integrated Pt1000 temperature sensor
- ❑ According to IEC / EN / VDE, a calibrated reference solar cell is required.



## Digital multimeter METRAHIT X-TRA

### 4½ Place TRMS System Multimeter

- ❑ Resolution: ± 12,000 digits, 4½-place
- ❑ 3 connector jacks with patented automatic blocking sockets (ABS)
- ❑ Voltage measurement with a basic accuracy of ±0.05% (V DC)
- ❑ Auto-range current measurement from 100 µA (resolution: 10 nA) to 10 A (16A) via a single connector jack and a single fuse
- ❑ Large, light-blue illuminated display with extra large characters (15 mm) and an analog bar graph for dynamic processes
- ❑ Separate battery and fuse compartments
- ❑ IP 52 protection against dust and water
- ❑ Measuring categories: 1000V CAT III and 600V CAT IV
- ❑ Furnished with DKD calibration certificate



## Digital multimeter METRAHIT EXTRA

### 4 6/7 Place High-End TRMS Digital Multimeter, System Compatible with Data Memory and IR Interface, Resolution: 60,000 Digits - 26 Multimeter Functions

- ❑ Data logger function with 2048 kB data memory, i.e. for up to 61,600 measured values
- ❑ Infrared interface for data exchange and parameters configuration with a PC (optional: IR-USB adapter and METRAwin10 software)
- ❑ Power pack connector socket for operation without batteries
- ❑ TRMS AC and AC+DC voltage measurement, bandwidths of up to 50 kHz
- ❑ TRMS AC and AC+DC current measurement, bandwidths of up to 10 kHz
- ❑ dB measuring function
- ❑ Adjustable clamp factor for measurement with current sensor and current transformer clamps



## NEW METRAHIT MULTICAL

### Universal Calibrator, Simulator and Multimeter

- ❑ mA / mV ... V / °C (Pt100/1000, Ni100/1000, Thermoelement J,L,T,U,K,E,S,R,B,N) / 30...2000 Ω
- ❑ Dual mode – simultaneous calibration and measurement (U/I)
- ❑ Memory for measurement results: 16 MBit
- ❑ Frequency and pulse run generators: 1 Hz to 2 kHz
- ❑ Ramp and staircase functions
- ❑ METRAwin®90-2 interface and calibration software
- ❑ Transmitter simulator (sink: 0 ... 24 mA)
- ❑ Rugged, EMC compliant design, DKD calibration certificate included
- ❑ Precision multimeter (V, A, Ω, F, Hz, °C/°F) 30,000 (60,000) digits and triple display
- ❑ TRMS AC measurement to 1 kHz



## SECUSTAR FM+

### Modular Measuring and Test System

- ❑ Testing for (electrical) safety of operating equipment conducted by trained persons
- ❑ Predefined, standardized test steps and test sequences
- ❑ Can be easily supplemented with individual test steps and sequences
- ❑ Operation via color touch-screen
- ❑ Sensors for temperature, atmospheric humidity, luminous intensity etc.
  - can be connected via USB interface
- ❑ Mains-independent operation with rechargeable batteries
- ❑ Country-specific mains cable and test socket for electrical tests
- ❑ Data entry with soft-keys, external keyboard, barcode, RFID
- ❑ List generator for the evaluation of stored object data
- ❑ Data interfaces: USB, Ethernet



Abb. mit SI-Modul (optional)

### SECUTEST S2N+ / S2N+10

#### Test Instrument for BGV A3 and MPG (German medical product legislation)

- Electrical equipment per DIN VDE 0701-0702, 2008-6 edition
- Electrical medical devices per DIN VDE 0751 / IEC 62353
- additionally with SECUTEST S2N+10:
  - Testing of protective conductor resistance up to 10 A possible
- Data interface for PC, printer and barcodes
- Automatic adaptation to either 110 V / 60 Hz or 230 V / 50 Hz mains power
- Automatic recognition of safety class (I, II) (with german and french outlet only) and mains connection errors
- Menu-driven test sequences: fully automated or manual
- Safety for the user thanks to integrated personal protection - suitable for persons with basic electro-technical instruction
- Including calibration certificate in accordance with DKD



### SECUTEST SI+

#### Storage and Input Module for SECUTEST

- Test results ascertained with the test instruments are transmitted to the SI module directly via the interface. Test results can be saved on-site in the form of clear-cut, reliably documented measurement and test reports with date and time.
- Stored data can be transferred to a PC at a later point in time entirely independent of the test instrument. These data can then be processed with PS3 or PC.doc-WORD/EXCEL software (ELEKTROmanager and PROTOKOLLmanager in preparation).
- Optional barcode scanner – The B3261 barcode scanner (accessory) can be connected to the SI module. Information available in the form of barcodes can thus be quickly, easily and reliably entered to test reports. This type of data entry allows for time-saving, inexpensive acquisition of large quantities of information, for example during series measurements conducted for devices which are labeled with barcodes.



### SECUTEST SIII+

#### Test Instrument for DIN EN 60601/60335/60950/61010, DIN VDE 0700/0701-0702 and IEC 62353 (DIN VDE 0751)

- Electrical equipment per DIN VDE 0701-0702, 2008-6 edition
- Electrical medical devices per DIN VDE 0751 / IEC 62353 and EN 60601
- Electrical equipment for measurement, control and laboratory use per EN 61010
- Electrical household appliances per EN 60335
- Data processing devices and equipment per EN 60950
- Automatic adaptation to either 110 V / 60 Hz or 230 V / 50 Hz mains power
- Automatic recognition of safety class (I, II) (with german and french outlet only) and mains connection errors
- Menu-driven test sequences: fully automated or manual
- Safety for the user thanks to integrated personal protection - suitable for persons with basic electro-technical instruction
- Data interface for PC, printer and barcodes
- Function test with power analysis , Temperature measurement
- Including calibration certificate in accordance with DKD

## Test and measurement

## GOSSEN METRAWATT



### METRATESTER 5+

#### Test Instrument for DIN VDE 0701-0702

- Differential current measurement:  
Measurement of differential current complies with DIN VDE 0701-0702.2008
- Display functions: All measured values are clearly displayed at a large, digital display
- Exceeded limit values are also indicated optically, and in some cases acoustically as well
- Propriety calibration certificate as standard



### METRATESTER 5+3P

#### Test Case for Single and 3-Phase Equipment per DIN VDE 0701-0702

- can also be used as a workshop test panel per DIN VDE 0104
- The METRATESTER 5+3P test case complies with "guidelines for equipment required for electrical installation operations" issued by the Federal Committee for Electrical Installations, ZVEH, WFE and electrical power utilities



### VLE 2

#### Adapter for Testing Protective Conductor and Insulation Resistance of Appliances and Extension Cables

The test adapter is intended for the performance of measurements and testing at electrical devices and extension cables with CEE plug connectors in combination with test instruments in accordance with the following standards:

- DIN VDE 0701-1:2000 (testing after repair)
- DIN VDE 0702 (periodic testing)



### AT3-IIIE

#### Adapter for Testing 3-Phase Devices and Extension Cables in Combination with SECUTEST Series Safety Testers

- Testing of 1 to 3-phase consumers and extension cables in combination with SECUTEST S-II and S-III external test instruments
- Additional protection for testing defective devices under test thanks to integrated residual current monitoring with shutdown function
- Test for automatic shutdown function with self-test button
- Short-circuiting and the blowing of mains fuses are prevented by means of pre-testing
- Automatic adaptation to the program selected at the SECUTEST-Sxx test instrument and transmission of measured values
- Testing of protective conductor resistance, insulation resistance, equivalent leakage current, dielectric strength, residual current and contact current in combination with SECUTEST SII and SIII



### AT3-IIS

#### Adapter for Testing 3-Phase Devices in Combination with SECUTEST Series Safety Testers

DIN VDE tests **without mains operation**

- Protective conductor resistance, insulation resistance, equivalent leakage current

DIN VDE tests **with mains operation**

- Differential current, contact current

Equipped with 5-pole CEE 32 A (max. 20 A) and CEE 16 A  
Dimensions: 290 x 120 x 105 mm, weight: approx. 2.4 kg

# GOSSEN METRAWATT

# Test and measurement



## Profitest Master

### Range of Test Instruments for VDE 0100 / IEC 60364.6

A broad-range measuring device allows for use of the test instrument in all alternating and 3-phase electrical systems with voltages from 65 to 500 V and frequencies of 15.4 to 420 Hz.

- Measurement of contact voltage without tripping the RCCB Contact voltage with reference to nominal residual current is measured with 1/3 of nominal residual current
- Intelligent data transfer Bidirectional interface to DDS-CAD electronic engineering
- Display of approved fuse types for electrical systems
- Energy meter start-up testing
- Calculation of cable lengths for common copper wire cross-sections
- Measurement of biasing, leakage and circulating current of up to 1 A, as well as working current of up to 150 A with Clip 0100S current sensor clamp as accessory
- Phase sequence measurement (including highest line-to-line voltage)



## NEW METRISO G500 / G1000

### Range of Test Instruments for Insulation, Low-resistance and Voltage Measurements

- Insulation measurement per EN 61557-2 / VDE 0413 Teil 2  
Insulation measuring range 100 - 200 GOhm
- Low-resistance measurement per EN 61557-4 / VDE 0413 part 4  
Low-resistance measuring range 0,01 - 10 Ohm
- Voltage testing and measurement up to 500 V (G500), 1000 V (G1000)
- Indication of dangerous contact voltage
- Test voltages: 50, 100, 250, 500 V, (1000 V)
- Overvoltage protection
- Regular check of the device function with an integrated testing resistor possible acc. to EN 50110-1 ( VDE 0100-500)
- Rugged housing with rubber cover, Backlit display
- Power supply with 8 x AA Batteries
- DKD calibration certificate in scope of delivery



## METRAHIT ENERGY

### 4 6/7 Place High-End Digital Multimeter with Power and Energy Measurement

- TRMS measurement including: V AC TRMS, V AC+DC TRMS with a bandwidth of 100 kHz, V DC, dB, Hz (V), Hz (A),  $\Omega$ ,  $\mu$ F, V Diodes,  $^{\circ}$ C / F (TC / RTD)
- Power measurement (W, VAR, VA, PF): active, reactive and apparent power with extreme values, power factor
- Energy measurement (Wh, VARh, VAh), active, reactive and apparent energy, mean power value with adjustable observation period and maximum value
- Mains quality analysis: recording of over and undervoltage, dips, swells, voltage peaks and transients in 0, 50 and 60 Hz syst
- Harmonic analysis: RMS values and distortion components up to the 15th harmonic at 16.7, 50, 60 and 400 Hz



## MAVOWATT 20

### 3-Phase Energy and Power Analyzer EnergyPlatform

The Energy Platform is an innovative and essential tool for any electrical energy monitoring application.

Whether you want to understand your utility costs, improve efficiency, install energy savings devices, explore alternative energy solutions or even determine your carbon footprint, Energy Platform provides the essential monitoring tools to meet your energy monitoring requirements. Energy Platform's 1/4 VGA color touch display, automatic setups, easy to read reports and Energy Platform Report Writer (EPRW) software provide a simple to use, yet powerful tool for any application.

## Industrial measurement

## GOSSEN METRAWATT



### GEOHM 5

#### Battery Powered Earth Tester per DIN VDE 0413, part 5

- Measurement of: Earth resistance, Selective earth resistance, Soil resistivity, Current (TRMS) via clip-on meter (optional)
- Three or four-pole measuring method
- No balancing required
- Continuous monitoring of interference voltage and auxiliary earth electrode resistance with indication if allowable limit values are violated
- Data storage for 250 measurements (1000 measured values)
- Data interface for transmission of measured values to a PC
- Software (optional accessory) for measured value storage and report generation at a PC (in preparation)



### A2000

#### Multifunctional Power Meter for 3-Phase Systems

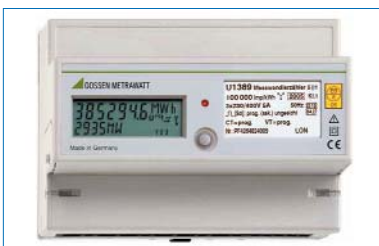
- Measurement of current, voltage, active, reactive and apparent power, power factor, active and reactive energy, harmonic distortion and harmonics
- Precision measured values with error limits of 0.25% for U and I
- Depending upon model, capable of communications with Profibus-DP, LONWORKS interface or RS 485 interface with Modbus RTU and other protocols
- Front panel dimensions: 144 x 144 mm, Minimal installation depth of less than 60 mm
- Good legibility thanks to the high contrast, 14 mm LED display
- Electrically isolated current inputs
- Two limit value contacts which can be assigned as desired to measured values



### MAVOLOG 10

#### Tester for Monitoring Mains Quality and Power Analyzer

- Monitoring of mains quality with simultaneous recording of 3-phase AC quantities
- Internal analysis of voltage quality at short-term, daily and long-term intervals in accordance with EN50160 and other industrial standards
- 640 k internal memory, user configurable capacitance components for various measuring and testing tasks
- MAVOLAN RS485 field bus with multi-drop connection for up to 32 devices
- Alarm output for events messages



### U1281 ... U1389, U389A/B

#### Electrical Energy Meters for Household, Industrial and Building Management Applications

- Can be calibrated - Approved for official billing in accordance with calibration legislation
- Easy to install - Indicates correct connection
- Compact - Fits in small distributors
- Communication functions - Can be connected to data logging and billing systems



### SYSKON P1500

#### Lab Power Supplies, Computer Controlled

- Auto-ranging output with 1500 W of power
- Measuring functions for voltage, current and power with threshold memory (min & max values)
- Minimal residual ripple and short response times
- USB, RS232C Interface (standard) / IEEE488 Interface (plug-in module option)
- Integrated sequence function for the generation of voltage and current profiles with programmable sequence chain
- Storage of 12/15 device configurations
- Output can be switched on and off
- Overvoltage, overcurrent and excessive temperature protection



### SMARTCONTROL

#### Energy Control System

The new, multi-talented SMARTCONTROL expands the Energy Control System, which enjoys widespread use in industrial environments. It unites energy and consumption data logging for a wide variety of media with peak load optimization, control functions and error message management. And thus it's not only possible to monitor consumption, it can be influenced as well. Valuable resources can be used more efficiently, energy costs can be lastingly reduced and opportunities provided by modern energy management can be fully exploited.

- Acquisition of energy and consumption data, temperatures, switching statuses and process quantities
- Error message management, continuous comparison of characteristic values and indication of errors via switching output, e-mail or SMS
- Peak load management in combinations with switching outputs
- Timer programs and switching of relays after the occurrence of predefined events
- Calculation of mean values and integrals, as well as heating and cooling quantities
- 8 + 24 digital inputs, active or passive  
(standard: 8, input/output module for 24 channels: 24)
- 8 analog inputs, 0 to 20 mA, 0 to 10 V
- 8 temperature inputs for PT1000 platinum sensors
- 2 + 4 switching outputs, semiconductor relays, max. 40 V= $\sim$ , max. 1 A  
(standard: 2, input/output module for 24 channels: 4)
- 2 analog outputs (input/output module for 24 channels)
- SMARTCONTROL manager configuration and data read-out software included



## Photo and light measuring technique



### MAVOLUX 5032 C/B USB

#### Illuminance meters of the precision class C or B

- Precision meters for measuring the illuminance in Lux and Footcandles meeting Standard Specification DIN 5032-7, Class C or B and EN 13032-1, Appendix B
- The silicon photo diode is colour corrected, i.e. its spectral responsivity is matched to the photopic daylight vision of the human eye  $V(\lambda)$ .
- Luminance can be measured in  $cd/m^2$  or fL when using the Luminance Attachment (optional)
- Cosine correction for light inciding at an angle
- 3 1/2 digits display / Backlight display illumination (only in MAVOLUX 5032 B USB)
- Data storage of up to 100 measurements, Auto and manual range selection
- USB Port 1.1
- CD-Rom with software for processing the values measured and controlling the meter
- Compact transport case and USB cable included



### MAVO - MONITOR USB for Contact Measurements

#### Precision measurement of the luminance

- Classified according to DIN 5032-7 Class B and CIE no. 69
- Silicon photo diode, colour corrected, i.e. its spectral responsivity is matched to the spectral photopic vision of the human eye  $V(\lambda)$ .
- Fully functional for all professional requirements
- 3 1/2 digit display
- Data storage of max. 100 values
- Automatic battery test
- USB 1.1 Interface
- CD Rom with software for processing the values measured and regulating the meter
- Ever-ready case and USB cable included



# GMW GOSSSEN Müller & Weigert measure/display devices

## Excerpt from our program



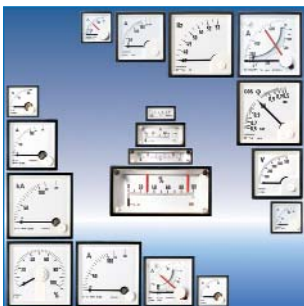
### Analog Display Units

- Complete family of measuring instruments for current, voltage, wattage, power factor, frequency, bimetal ammeter
- Housing to DIN standard square/rectangular shape
- Changeable scales
- Subassembly and built-in devices



### Electronic Panel Meters

- Process control, automation & laboratory uses
- Class 0,01 up to 1
- Current, voltage, frequency, temperature, RPM, pressure, etc.
- LED and LCD displays
- 1999 to 99999 digits
- DIN 43700 panel mounting cases



### Contact Devices

- For all electrical values
- Pt 100 and thermocouple elements
- 1 or 2 limit values
- Switching behaviour acc.to rest current and operating current principle
- 7 housing size to DIN standard



### Text Display / Printer

- 5 different versions
- 1 and 2 lines
- 20 / 80 characters
- International character sets
- Industrial panel mounting printer
- Paper re-roII mechanism



### Bargraph Displays

- Analogue and digital displays
- 1 and 2 measuring channels
- Fluorescent display or LED's
- Up to 4 settable limit values
- Row or needle displays
- Built-in housing to DIN standard



# General Terms of Sale

## § 1 General; Applicability

- (1) Our terms of sale shall be applicable exclusively. We shall not recognize any terms of the purchaser which conflict with, or deviate from, our terms of sale unless we have explicitly accepted them in writing. Our terms of sale shall also be applicable in cases where we perform delivery to the purchaser without reservation, knowing about terms of the purchaser that conflict with, or deviate from, our terms of sale.
- (2) The contract includes in writing all agreements made between us and the purchaser for the purpose of its implementation.
- (3) Our terms of sale shall only apply to companies as defined by § 310 para. 1 BGB (German Civil Code).
- (4) Partial delivery has to be accepted as far as the delivery is reasonable.

## § 2 Offer; Offer Documents

- (1) If the order is to be considered an offer under § 145 BGB we may accept it within 2 weeks.
- (2) We shall reserve ownership and copyright of any illustrations, drawings, calculations and other documents. This shall also apply to written documents classified as "confidential". The purchaser shall not hand them over to third parties unless explicitly authorized to do so by us in writing.

## § 3 Prices; Payment Terms

- (1) Unless specified otherwise in our order acceptance our prices shall apply "ex works", not including packaging, which shall be charged separately.
- (2) Our prices shall not include statutory value-added tax. VAT shall be listed separately in the invoice at the statutory rate applicable on the invoice date.
- (3) Discounts shall not be applicable unless agreed explicitly in writing.
- (4) Unless specified otherwise in the order acceptance the full net sales price shall be due for payment within 30 days from the invoice date. The statutory provisions for consequences of default in payment shall be applicable.
- (5) The purchaser shall not have any rights to offset mutual claims unless his counter-claims have been legally established and are uncontested or have been recognized by us. Furthermore he shall have the right to retain payment to the extent his counter-claim is based on the same contractual relationship.
- (6) In so far as we have assumed the erection or assembly function unless otherwise agreed the purchaser shall bear all the necessary ancillary costs in addition to the agreed compensation, e. g. travelling costs, costs for the transport of tools and of personal luggage.

## § 4 Delivery Period

- (1) The delivery period specified by us shall begin once all technical issues have been clarified.
- (2) Purchaser's timely and proper fulfillment of his obligations shall be a prerequisite for us to meet our obligation to deliver. We shall reserve the right to the defence of non-performance of the contract.
- (3) If the customer is in default of acceptance or violates by negligence or intent any other obligations to co-operate we shall have the right to claim compensation for any damage we have suffered including any extra expenditure. We shall reserve the right to make any further claims.
- (4) If the conditions described in para. (3) apply the risk of accidental loss or accidental deterioration of the object of sale shall be transferred to the purchaser at the moment when he has defaulted on acceptance or payment.
- (5) We shall bear the statutory liability if the underlying contract is a transaction for delivery by a fixed date under § 286 para. 2 no. 4 BGB or § 376 HGB (German Commercial Code). We shall also bear the statutory liability if a default in delivery for which we are responsible results in the purchaser's right to state that he has lost interest in the further implementation of the contract.
- (6) We shall also bear the statutory liability if our default in delivery was due to our breach of contract by intent or gross negligence. Culpable action by our representatives or vicarious agents shall be attributable to us. Unless the default in delivery is based on our intentional breach of contract our liability for damages shall be limited to the foreseeable damage that may typically occur.
- (7) We shall also bear the statutory liability if our default in delivery was due to our culpable violation of a material contractual obligation. In such cases our liability for damages shall be limited to the foreseeable damage that may typically occur.
- (8) In the event of default in delivery we shall further bear the statutory liability up to a lump sum compensation for default of 0.5 % per full week of default, the maximum being 5 % of the value of the delivery.
- (9) Further statutory claims and rights of the purchaser shall be reserved.

## § 5 Transfer of Risk; Packaging Costs; Assembly and Erection; Acceptance

- (1) Unless specified otherwise in our order acceptance the agreed form of delivery shall be "ex works".
- (2) In so far as delivery is agreed with erection or assembly the risk shall be transferred on the date of acceptance in the own operations of the purchaser or, if agreed, after a perfect trial run.
- (3) We shall not take back any transportation packaging and other packaging as specified in the Packaging Ordinance, except pallets. The purchaser shall be obliged to ensure disposal of the packaging at his own expense.
- (4) In so far as we insist on acceptance of delivery after completion the purchaser shall undertake this within two weeks. If this is not done acceptance will be deemed to have been made. Acceptance shall equally be deemed to have been made if delivery has been put into service or if agreed upon after the end of an agreed trial period.
- (5) If requested by the purchaser we shall take out a transportation insurance for the delivery. The according costs shall be borne by the purchaser.

## § 6 Liability for Defects

- (1) The purchaser shall not have the right to make claims based on defects unless he has fulfilled the duty to examine the goods/service and give notice under § 377 HGB.
- (2) If the object of sale has a defect the purchaser shall be entitled, at his discretion, to remedy by repair or to delivery of a new, flawless object of sale. In the event of remedy by repair we shall be obliged to bear all necessary costs of the repair, especially transportation, travel, labour, and material costs, not including additional costs caused by transportation of the object of sale to a place other than the place of delivery/performance.

(3) If remedy fails the purchaser shall have the right, at his discretion, to demand rescission of the contract or a price reduction.

(4) We bear the statutory liability if the purchaser asserts claims for damages on the grounds of actions involving our, our agents' or our vicarious agents' intent or gross negligence. Unless we are charged with intentional breach of contract our liability for damages shall be limited to the foreseeable damage that may typically occur.

(5) We bear the statutory liability if we culpably violate any material contract provision. In such cases our liability for damages shall be limited to the foreseeable damage that may typically occur.

(6) Liability for culpable injury to life, body and health shall remain unaffected. The same shall apply to mandatory liability under the German Product Liability Act.

(7) Unless specified otherwise above any liability shall be excluded.

(8) The limitation period for claims based on defects shall be 12 months, beginning upon transfer of risk.

(9) The limitation period in the event of recourse on delivery under §§ 478, 479 BGB shall remain unaffected. It shall be five years, beginning upon delivery of the defective goods.

(10) Our guaranty may be refused in the event of delay of payment or loss of credit.

## § 7 Total Liability

(1) Any further liability for damages beyond the provisions of § 6 shall be excluded, regardless of the legal nature of the asserted claim. This shall apply especially to claims for damages resulting from culpa in contrahendo, breach of other obligations or claims in tort for compensation of property damage under § 823 BGB.

(2) As far as our liability for damages has been excluded or restricted the same shall apply with regard to the personal liability for damages of our staff, representatives and vicarious agents.

## § 8 Retention of Title

(1) We shall retain title to the object of sale until all payments under the delivery contract have been received. In the event of a breach of contract by the purchaser, especially default in payment, we shall have the right to take the object of sale back. Taking back the object of sale shall not constitute a rescission of the contract unless we have explicitly declared rescission in writing. Seizure of the object of sale by us shall always constitute a rescission of the contract. After taking back the object of sale we shall have the right to realize it. The realization revenue shall be subtracted from the purchaser's obligations to us – less adequate realization costs.

(2) The purchaser shall treat the object of sale with care. He shall be obliged to insure it, at his own expense, against damage caused by fire, flood and theft at a sufficient repurchase value. Any necessary maintenance and inspection work shall be done by the purchaser in good time at his own expense.

(3) In any event of seizure or other third party action the purchaser shall immediately inform us in writing to allow us to take legal action under § 771 ZPO (German Code of Civil Procedure). Unless the third party is able to refund our court expenses and legal fees of an action under § 771 ZPO the purchaser shall be liable for the loss suffered by us.

(4) The purchaser shall be entitled to sell the object of sale in the course of regular business. However, by entering the contract with us the purchaser shall already assign to us any claims against his customer or third parties from such sale up to our total invoice sum (incl. VAT). This provision shall apply regardless of whether or not the object of sale has been processed before sale. Notwithstanding such assignment the purchaser shall have the right to collect such claims. Our right to collect such claims ourselves shall remain unaffected by this clause. We undertake not to collect any claims as long as the purchaser meets his payment obligations from the revenue he has received, does not default on payment and as long as no bankruptcy, composition or insolvency proceedings have been opened or cessation of payments has occurred. If this is the case, however, we shall have the right to demand that the purchaser inform us of all assigned claims and the respective debtors, hand over to us all documents required for collection and inform the debtors (third parties) of the assignment.

(5) Any processing or transformation of the object of sale by the purchaser shall be on our behalf. If the object of sale is processed with other objects not belonging to us we thereby acquire an ownership share in the new object on a pro rata basis relating to the value of the object of sale (total invoice sum, incl. VAT) and the value of the other processed objects at the time of processing. Otherwise the provisions governing our object of sale delivered with reservation of title shall also be applicable to the object created by processing.

(6) If the object of sale is inseparably mixed with other objects not belonging to us we shall thereby acquire an ownership share in the new object on a pro rata basis relating to the value of the object of sale (total invoice sum, incl. VAT) and the value of the other objects mixed with it at the time of blending. If mixing occurs in such a manner that the purchaser's object is to be considered the main object the agreement is that the purchaser shall transfer a pro rata ownership share to us. The purchaser shall keep the property in our ownership or co-ownership on our behalf.

(7) In order to secure our claims against the purchaser the purchaser shall also assign to us such claims against third parties as arise from the combination of the object of sale with a piece of real property.

(8) We undertake to release, upon the purchaser's request, the securities provided to us to the extent the achievable realization value of our securities exceeds the secured claims by more than 20 %. We shall have the right to select the securities to be released.

## § 9 Place of Jurisdiction; Place of Performance

(1) If the purchaser is a merchant the place of jurisdiction shall be our company seat. We shall also have the right to bring an action against the purchaser in the court of his residence.

(2) German law shall be applicable. Application of the UN Sales Convention shall be ruled out.

(3) Unless specified otherwise in our order acceptance the place of performance shall be our company seat.

## § 10 Severability clause

This contract shall remain valid even if individual provisions thereof are ineffective or are invalid. This shall not apply if adherence to the contract would cause an unreasonable hardship for one of the parties. The parties to this contract will cooperate in order to replace the invalid provision by a valid provision which comes closest to the original economic intention of the parties.

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