



Wireless CPU Q24 Series Differences with the WISMO Quik Q24xx series

Revision: 002

Date: September 2006

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Wireless CPU Q24 series

Differences with the WISMO Quik Q24xx series

Reference: **WM_PRJ_Q24NG_PTS_004**
Revision: **002**
Date: **September 2006**

The Wireless CPU Q24 Series is pin to pin compared to the previous WISMO QUIK Q24xx sub-series, and offers improvements such as:

- Wider RF connectivity
- Quad band
- Improved RF performances
- Reduced power consumption
- SIM 3V/1V8 supported
- Optional integrated SIM CARD connector
- Voltage regulator output available (up to 100mA)
- Back-up battery regulator available




Powered by the Wavecom Operating System and Open AT®

Cautions

This platform contains a modular transmitter. This device is used for wireless applications. Note that all electronics parts and elements are ESD sensitive.

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Web Site Support

General information about Wavecom and its range of products: www.wavecom.com

Specific support is available for the Q24 Classic, Plus, Extended and Auto Wireless CPU: www.wavecom.com/Q24Classic,

www.wavecom.com/Q24Plus,

www.wavecom.com/Q24Extended,

www.wavecom.com/Q24Auto

Carrier/Operator approvals: www.wavecom.com/approvals

Open AT® Introduction: www.wavecom.com/OpenAT

Developer support for software and hardware: www.wavecom.com/forum

Overview

This document summarizes the difference between the Wireless CPU Q24 series (available in four GSM/GPRS Class 10 quad-band versions) and the WISMO Quik Q24xx sub-series.

The Wireless CPU Q24 versions are:

- **Q24 Classic:** EGSM 900/1800/850/1900 MHz version with 32 Mb of Flash memory and 16 Mb of PSRAM (32/16), T° range [-20°C / +55°C].
- **Q24 Plus:** EGSM/GPRS 900/1800/850/1900 MHz version with 32 Mb of Flash memory and 16 Mb of PSRAM (32/16), T° range [-20°C / +55°C].
- **Q24 Extended:** EGSM/GPRS 900/1800/850/1900 MHz version with 32 Mb of Flash memory and 4 Mb of SRAM (32/4), Extended T° range.
- **Q24 Automotive:** EGSM/GPRS 900/1800/850/1900 MHz version with 32 Mb of Flash memory and 4 Mb of SRAM (32/4), Extended T° range.

The WISMO Quik versions are:

- **Q2400A:** EGSM 900/1800 MHz version with 16 Mbits of Flash memory and 2 Mbits of SRAM (16/2).
- **Q2406A:** EGSM/GPRS 900/1800 MHz version with 16 Mbits of Flash memory and 2 Mbits of SRAM (16/2).
- **Q2406B:** EGSM/GPRS 900/1800 MHz version with 32 Mbits of Flash memory and 4 Mbits of SRAM (32/4).
- **Q2426A:** GSM/GPRS 850/1900 MHz version with 16 Mbits of Flash memory and 2 Mbits of SRAM (16/2).
- **Q2426B:** GSM/GPRS 850/1900 MHz version with 32 Mbits of Flash memory and 4 Mbits of SRAM (32/4).

Document History

Revision	Date	List of revisions	
001	May 2006	Creation (Preliminary version)	
002	August 2006	Update GPC difference list Update mechanical drawings with new SIM holder	

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1 References

1.1 Reference Documents

For more details, several reference documents may be consulted. The Wavecom reference documents are provided in the Wavecom documents package contrary to the general reference documents, which are not Wavecom owned.

1.1.1 Wavecom Reference Documents

- [1] Automotive Environmental Control Plan for Wireless CPU Q24 series
WM_PRJ_Q24NG_DCP_001
- [2] Environmental Control Plan for Wireless CPU Q24 series
WM_PRJ_Q24NG_DCP_002
- [3] Wireless CPU Q24 series Customer Design Guidelines
WM_PRJ_Q24NG_PTS_002
- [4] Wireless CPU Q24 series Process Customer Guidelines
WM_PRJ_Q24NG_PTS_003
- [5] AT Commands Interface Guide for OS 6.57
WM_ASW_OAT_UGD_0044
- [6] AT Commands Interface Guide (Bluetooth)
WM_ASW_BLU_UGD_001
- [7] ADL User Guide for Open ATA® V3.12
WM_ASW_OAT_UGD_006
- [8] Wireless CPU Q24NG Product Technical Specification
WM_PRJ_Q24NG_PTS_001

1.1.2 General Reference Documents

- [9] "I²C Bus Specification", Version 2.0, Philips Semiconductor 1998
- [10] ISO 7816-3 Standard

1.2 Abbreviations

Abbreviation Description

3GPP	Third Generation Partnership Project
ADC	Analog to Digital Converter
A/D	Analog to Digital conversion
AT	ATtention (prefix for modem commands)
AUX	AUXiliary
CBS	Cell Broadcast Service
CLK	CLock
CMOS	Complementary Metal Oxide Semiconductor
CODEC	COder DECoder
CPU	Central Processing Unit
CTS	Clear To Send
dB	Decibel
DC	Direct Current
DCD	Data Carrier Detect
DCS	Digital Cellular System
DCXO	Digitally controlled crystal oscillator
DR	Dynamic Range
DSR	Data Set Ready
DTR	Data Terminal Ready
EDGE	Enhanced Data rates for GSM Evolution
EGSM	Extended GSM
EN	ENable
ESD	ElectroStatic Discharges
ETSI	European Telecommunications Standards Institute
FEM	Front End Module
FR	Full Rate
GND	GrouND
GPI	General Purpose Input
GPC	General Purpose Connector
GPIO	General Purpose Input Output
GPO	General Purpose Output
GPRS	General Packet Radio Service

Abbreviation	Description
GSM	Global S ystem for M obile communications
IF	Intermediate Frequency
INTR	INTeR rupt
I/O	Input / O utput
LCD	Liquid Crystal D isplay
LED	Light E mitting D iode
LNA	Low N oise A mplifier
LSB	Less S ignificant B it
MAX	MAX imum
MIC	MIC rophone
MIN	MIN imum
MMS	M ultimedia M essage S ervice
MS	M obile S tation
NOM	NOM inal
NTC	N egative T emperature C oefficient
PA	P ower A mplifier
PBB	P oly B rominated B iphenyl
PBDE	P oly B rominated D iphenyl E thers
PCB	P rinted C ircuit B oard
PCL	P ower C ontrol L evel
PCS	P ersonal C ommunications S ervices
PLL	P hase L ock L oop
RAM	R andom A ccess M emory
RF	R adio Frequency
RI	R ing Indicator
RoHS	R estriction of H azardous S ubstances
RST	ReSeT
RTC	R eal Time C lock
RTS	R equest T o S end
RX	R eceive
SCL	S erial C lock
SDA	S erial D Ata
SIM	S ubscriber Identification M odule
SMS	S hort M essage S ervice

Abbreviation	Description
SPI	Serial Peripheral Interface
SPK	SPEaKer
SRAM	Static RAM
TDMA	Time Division Multiple Access
TU	Typical Urban fading profile
TUHigh	Typical Urban, High speed fading profile
TDMA	Time Division Multiple Access
TX	Transmit
TYP	TYPical
UART	Universal Asynchronous Receiver-Transmitter
VLSI	Very Large Scale Integration
VSWR	Voltage Standing Wave Ratio

2 General Description

2.1 General Information

The Wireless CPU Q24 series is offered in four different versions. The denomination used for WISMO Quik Q24xx series is no more applicable. The table below defines for each WISMO QUIK Q24XX series product the Wireless CPU version.







Q24 Classic	Q24 Plus	Q24 Extended	Q24 Automotive
			
Quad-band GSM 1 to 6 MIPS -20/+55°C Optional SIM Holder 	Quad-band GSM / GPRS 9 to 13 MIPS -20/+55°C Numerous plug-ins Optional SIM Holder 	Quad-band GSM / GPRS 9 to 13 MIPS -40/+85°C Numerous plug-ins Optional SIM Holder	Quad-band GSM / GPRS 9 to 13 MIPS -40/+85°C MMS connector Numerous plug-ins Automotive qualified Traceability
Replaces Q2400A	Replaces Q2406B, Q2426B		Replaces Q24-C

Figure 1: Product correspondence

The differences between the Wireless CPU Q24 series and WISMO Quik Q24xx sub-series are detailed below.

2.2 Functional Differences

2.2.1 RF Band

As per definition in the previous dual-band WISMO Quik Q24xx sub-series, the Wireless CPU Q24 series products are quad-band as described in the table below:

RF capabilities

Product reference	RF band
Q2400-A	EGSM 900/1800 MHz
Q24 Classic	EGSM 850/900/1800/1900 MHz
Q2406-B	EGSM/GPRS CL 10 900/1800 MHz
Q2426-B	EGSM/GPRS CL 10 850/1900 MHz
Q24 Plus	EGSM/GPRS CL 10 850/900/1800/1900 MHz
Q2406-C	EGSM/GPRS CL 10 900/1800 MHz
Q24 Automotive	EGSM/GPRS CL 10 850/900/1800/1900 MHz

2.2.2 T° Range

The Q24 Extended is an additional product offered with the Wireless CPU range, compared to the WISMO Quik range. The Q24 Extended is compliant with an Extended T° range as described in the table below:

T° range capabilities

Product reference	T°range
Q2400-A	-20°C + 55°C Class A
Q24 Classic	-20°C + 55°C Class A
Q2406-B	-20°C + 55°C Class A
Q2426-B	-20°C + 55°C Class A
Q24 Plus	-20°C + 55°C Class A
Q24 Extended	-20°C + 55°C Class A -30°C + 75°C Class B -40°C + 85°C Class C
Q2406-C	-20°C + 55°C Class A -30°C + 75°C Class B -40°C + 85°C Class C
Q24 Automotive	-20°C + 55°C Class A -30°C + 75°C Class B -40°C + 85°C Class C

Wireless CPU Q24 series General Description

2.2.3 RF Connection, Connector Type and Position

All the previous RF connections offered by the WISMO Quik Q24xx sub-series are also supported by the Wireless CPU Q24 series.

One of the key improvements of the Wireless CPU Q24 series range is the RF connection offered to customers.

In addition to the antenna pad (dedicated to coaxial cable), it is also possible to use UFL connector, MMS connector or an IMP connector for the antenna connection.

The connectors offered for each version of the Wireless CPU range compared to the WISMO Quik Q24xx sub-series are described in the table below:

Product reference	UFL on bottom side	UFL or MMS on top side	Antenna pad on top side	IMP on bottom side
Q2400 A			X	
Q24 Classic	X		X	X
Q2406-B			X	
Q2426-B			X	
Q24 Plus	X		X	X
Q24 Extended	X		X	X
Q2406-C		X	X	
Q24 Automotive		X	X	X



Caution:

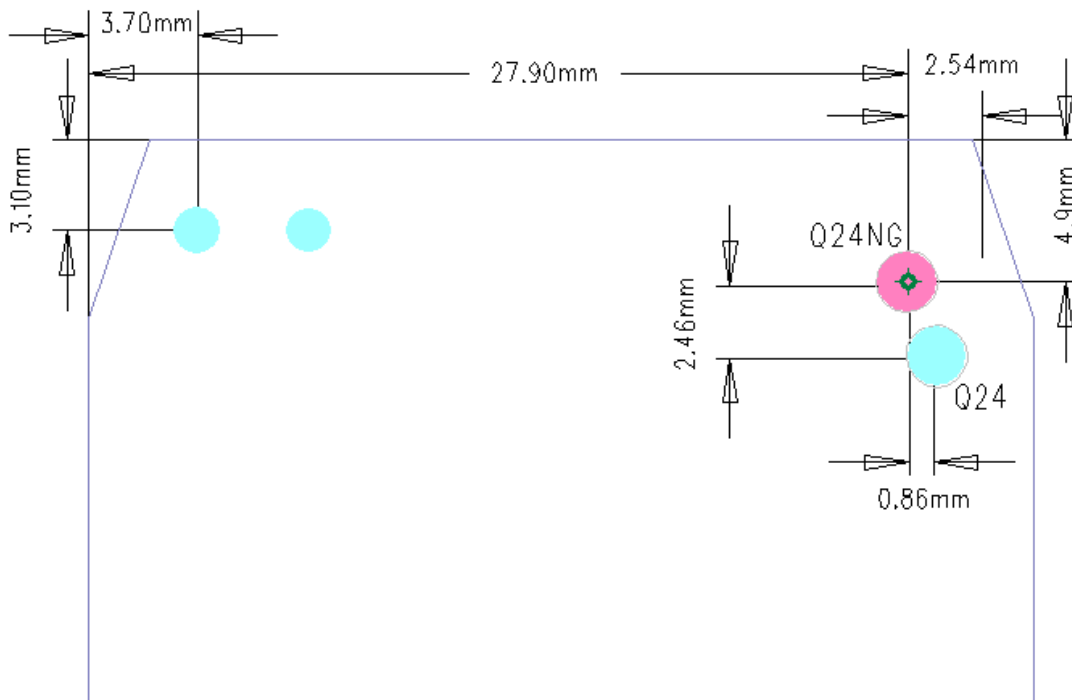
The antenna pad and MMS connector positions are slightly different on the Wireless CPU Q24 series; the coaxial cable compatibility used on a WISMO Quik Q24xx sub-series must be carefully checked. This is also the case for the MMS connector position



This new implementation is more flexible, in particular, the way in connecting the RF cable to the Wireless CPU Q24 series, offers a **wider angular position**.

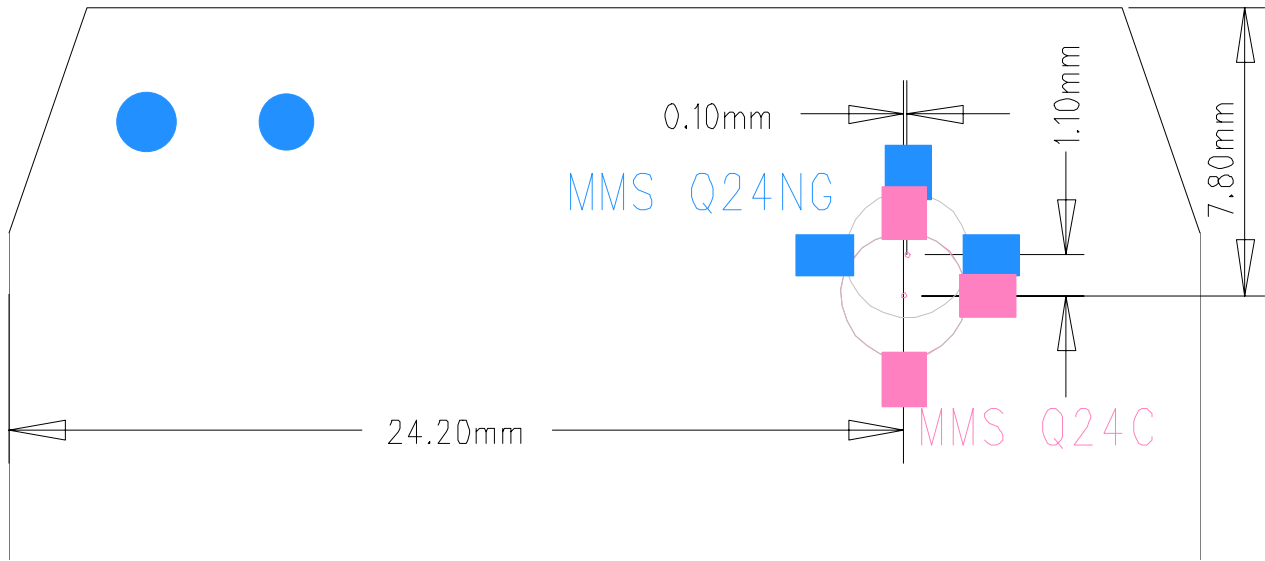
The figures below describe in detail the new antenna pad position and the new MMS connector position (see next pages)



Figure 2: The new antenna pad position

Figure 3: MMS connector position



DATE	20/03/2006	 confidential ©
VERSION	V1.0	
ENG	HTQ/ FPA MLR	
TITLE	Position Pointe RF	SCALE 0 2 4mm 
PROJECT	Q24NG 4RF	FORMAT --
N° D'IDENTIFIANT		WM0600101-001-10
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DATE	26/03/2006	 confidential ©
VERSION	V10	
ENG	HTO/ FPA MLR	
TITLE	DIFF - POSITION MMS	SCALE 0 2 4 mm 
PROJECT	Q24NG	FORMAT --
N° D'IDENTIFIANT		WM0600101-001-10
This document is the sole and exclusive property of WAVECOM. Not to be distributed or divulged without prior written agreement.		

2.3 General Purpose Connector Pin out Differences

Pin #	WISMO Quik Q24xx (all versions)			Wireless CPU Q24 series (all versions)		
	Signal Name	Function	Value	Signal Name	Function	Value
55 57 58 59 60	VBATT	Battery Input	3.3V to 4.5V	VBATT	Battery Input	3.2V to 4.5V
3	SIM-CLK	Clock for SIM interface	2.8V	SIM-CLK	Clock for SIM interface	2.9V or 1.8V
5	SIM-RST	Reset for SIM interface	2.8V	SIM-RST	Reset for SIM interface	2.9V or 1.8V
6	ON/OFF	Power ON/OFF control	Low logic=0 to 0.6V High logic =2.4V to VBATT +0.5V	ON/OFF	Power ON/OFF control	Low logic=0 to 0.6V High logic= 2.4V to 5V
7	SIM-DATA	I/O SIM interface	2.8V	SIM-DATA	I/O SIM interface	2.9V or 1.8V
9	SIM-VCC	SIM card supply	2.8V	SIM-VCC	SIM card supply	2.9V or 1.8V
40	VCC	2.8V digital supply output	2.8V /10mA	VCC-2.8V	2.8V digital supply output	2.8V /100mA
49	BUZZER	Buzzer output	80mA peak /Open collector	BUZZER	Buzzer output	100mA peak /Open drain

2.4 Power Supply Differences

A power supply designed for WISMO Quik Q24xx sub-series is fully usable for any product in the Wireless CPU Q24 series.

2.5 Power Consumption Differences

The table below aims to summarize the power consumption differences between the WISMO Quik Q24xx family and the Wireless CPU Q24 series, using the same Operating System (OS 6.57)

Wireless CPU Q24 series General Description

Operating mode	Parameters	INOM average		Difference	Unit	
		New Q24	Q24xx	New Q24/Q24xx		
OFF Mode		16.5	7	9.5	μA	
Alarm Mode		18.5	9	9.5	μA	
Fast Idle Mode	Paging 9	10.5	9.5	1	mA	
	Paging 2	13	12	1	mA	
Slow Idle Mode 1	Paging 9	2.8	2.5	0.3	mA	
	Paging 2	5.5	5.5	0	mA	
Fast Standby	VBATT = 3.6V	9.5	8.5	1	mA	
Slow Standby	VBATT = 3.6V	1.5	1.5	0	mA	
Connected Mode	GSM850	PCL5	217	300	-83	mA
	EGSM900	PCL19	90	100	-10	mA

2.6 Mechanical Differences

2.6.1 RF Interfaces

Except for the position of Antenna pad and MMS connector (refer to section 2.2.3), the Wireless CPU Q24 series is compatible with the WISMO Quik Q24xx sub-series.

- The position of 60-pin GPC is exactly the same.

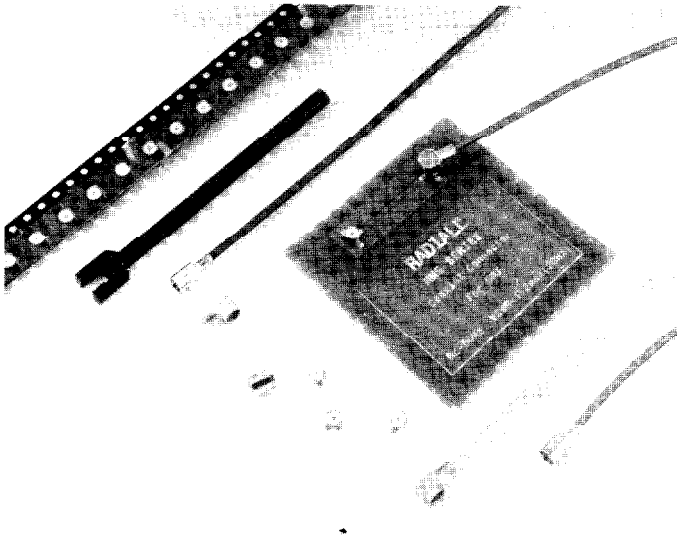
The shielding frame and cover has been updated for the Wireless CPU Q24 series, but is compatible for any application designed with a WISMO Quik Q24xx sub-series.

- The four legs positions remain the same.

RF connectors IMP/UFL and MMS were not offered with WISMO Quik Q24xx sub series.

Detailed specifications of these connectors may be found below:

- The supplier for the IMP connector is Radiall (<http://www.radiall.com>) with the following reference:
R107 064 900 or R107 064 902
- The supplier for the MMS connector is Radiall (<http://www.radiall.com>); detailed datasheet of this connector and associated cable is given below.



50 Ω	DC - 6 GHz
75 Ω	DC - 1 GHz

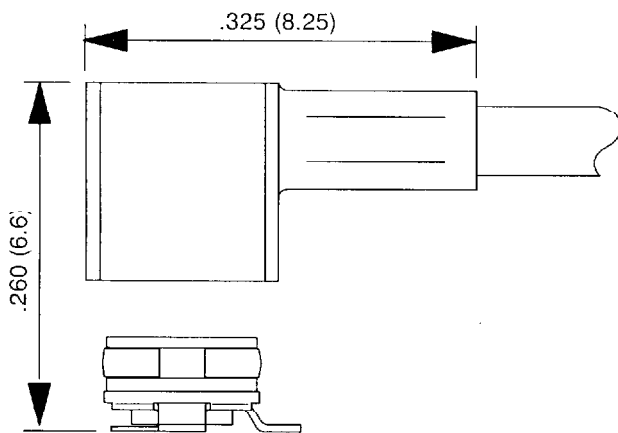
GENERAL

- Low profile coaxial connectors
- Surface-mount receptacle (SMT)
- Fully compatible with automated pick and place machines
- Snap-on mating
- High RF performance :
 - VSWR : 1.05 at 1 GHz / 1.15 at 2.5 GHz
 - RF leakage : -40 dB at 2 GHz
- Competitive pricing

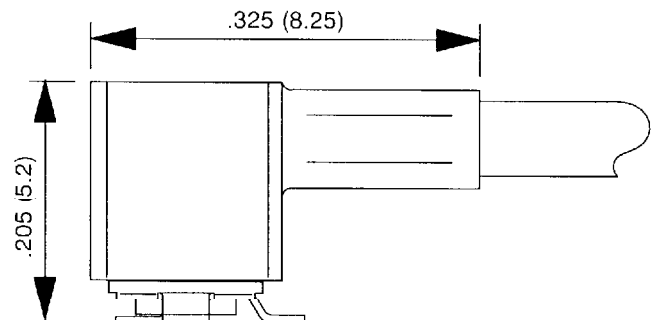
APPLICATIONS

- Base stations and hand-sets for :
 - cellular telephones
 - cordless telephones
- Satellite reception terminals (GPS, ...)
- Instrumentation
- Wireless datacom networks
- Automated payment systems
- Videocommunications
- Other general electronics

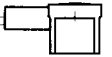
PROFILE



Unmated



Mated



	TEST STANDARD	RESULTS	
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ELECTRICAL CHARACTERISTICS

Impedance	Frequency range		50 Ω	75 Ω
			DC-6 GHz	DC-1 GHz
V.S.W.R. (mated pair)	IEC 1169-1		1.05 at 1 GHz 1.15 at 2.5 GHz 1.35 at 6 GHz	
Insertion loss	IEC 1169-1		0.2 dB at 2 GHz	
RF leakage (mated pair)	MIL STD 1344 method 3008		-50 dB at 500 MHz -45 dB at 1 GHz -40 dB at 2 GHz	
Outer contact resistance	NF-C 93050 (I = 40 mA peak)		5m Ω max	
Center contact resistance	NF-C 93050 (I = 40 mA peak)		15m Ω max	
Insulation resistance	IEC 1169-1		500 MΩ min (under 250 V RMS)	
Working voltage			50 V RMS	
Testing voltage (V RMS)	IEC 1169-1		Ø 1 mm : 250 ; Ø 2 mm : 500	
Maximum admissible power			40 W at 1 GHz / 20°C / V.S.W.R. = 1	

MECHANICAL CHARACTERISTICS

Durability	IEC 1169-1	50 matings
Force to engage	IEC 1169-1	7 N avg
Force to disengage	IEC 1169-1	5.5 N avg
Shocks (drop test)	IEC 68-2-27	50 g/11 ms ; 3 shocks/axis/way
Random vibrations	Général Motors spec.	Sine waves 5 to 1000 Hz 3 to 30g - 1 H/axis
Bumps (mechanical shocks)	IEC 68-2-29	25 g/6 ms 1000 bumps/axis/way
Cable retention force	IEC 1169-1	Ø 1 mm : 20 N ; Ø 2 mm : 35 N
Solderability	IEC 68-2-54	Passed

ENVIRONMENTAL CHARACTERISTICS

Temperature range		-40°C / +90°C
Climatic cycles	GAM I 13	48 H at 70°C - 24 H at 40°C/93% -36 H at -25°C

MATERIALS

Bodies plugs / in series adapters	Die cast zinc / brass
Bodies receptacles	Phosphor bronze
Center contact male	Brass
Center contact female	Beryllium copper
Insulator	PTFE

PLATING

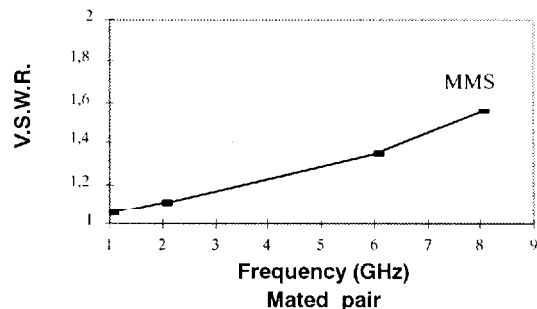
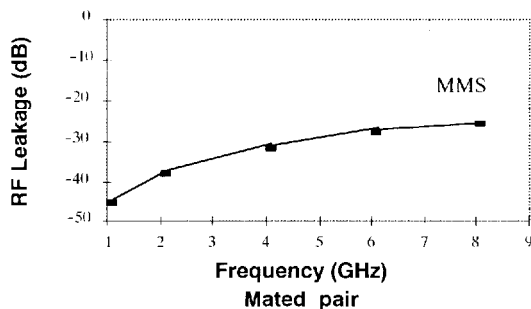
Bodies plugs, in series adapters	Nickel
Bodies receptacles	Gold
Center contact male	Nickel
Center contact female	Gold

POWER RATING

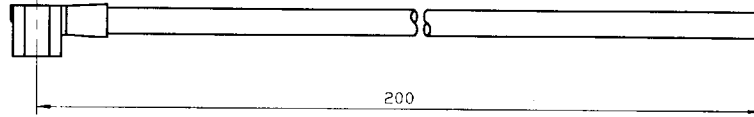
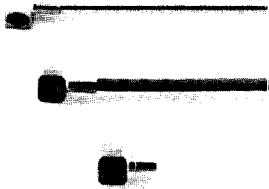
All dimensions are given in mm.

Example : P = 23 W at F= 1.8 GHz, T = 40°C, V.S.W.R. = 1.1

For any further information about the power handled, please see our power application guide (**D1 033 DE**).

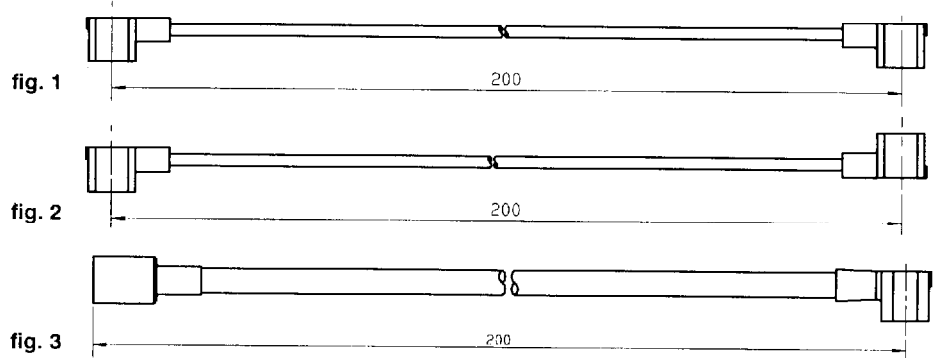


MMS PIGTAILS



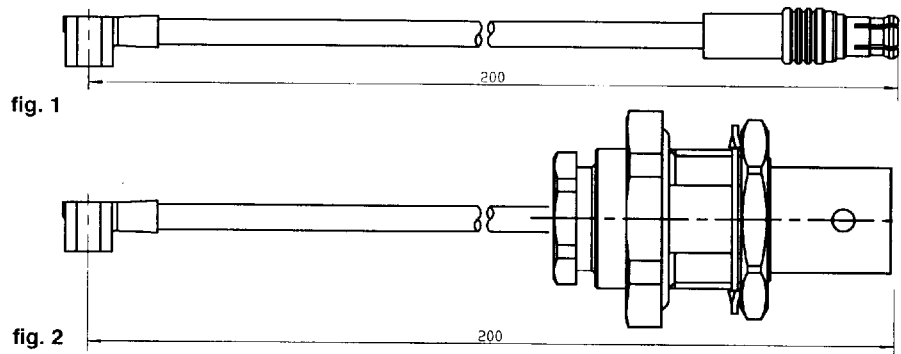
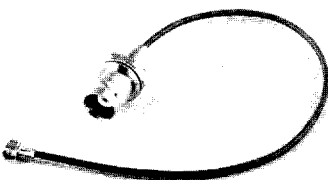
cable group	part number	composition
1 /50/ S	R285 001 001	R209 351 020 + C291 050 066
2 /50/ S	R285 001 021	R209 353 000 + C291 145 060
2 /50/ D	R285 001 031	R209 355 000+ C291 146 087
2 /75/ S	R285 001 041	R209 353 000 + C291 305 000

MMS CABLE ASSEMBLIES



cable group	part number	fig.	composition
1 /50/ S	R285 004 001	1	R209 351 020 + C291 050 066 + R209 351 020
1 /50/ S	R285 005 001	2	R209 351 020 + C291 050 066 + R209 351 020
2 /50/ S	R285 004 221	1	R209 353 000 + C291 145 060 + R209 353 000
2 /50/ S	R285 005 221	2	R209 353 000 + C291 145 060 + R209 353 000
2 /50/ S	R285 003 221	3	R209 080 000 + C291 145 060 + R209 353 000

BETWEEN SERIES CABLE ASSEMBLIES



cable group	part number	fig.	composition	series
2 /50/ S	R285 017 221	1	R209 353 000 + C291 145 060 + R113 081 020	MMS/MCX
2 /50/ S	R285 031 221	2	R209 353 000 + C291 145 060 + R141 323 000	MMS/BNC

Wireless CPU Q24 series General Description

A wide variety of cables fitted with UF-L connectors are proposed by HIROSE:

- UF-L pigtails,
- UF-L cable assemblies,
- Between series cable assemblies.

2.6.2 SIM Interfaces

The Wireless CPU Q24 Classic and Plus are proposed with an additional SIM interface:

A SIM CARD holder may be equipped on the top of the Wireless CPU.

If a SIM CARD holder is used; the thickness of this connector must be taken into account.

The figures shown in the next pages are detailed mechanical drawing of the Wireless CPU Q24 series, with and without SIM CARD holder.

Figure 4: Mechanical drawing of the Wireless CPU series

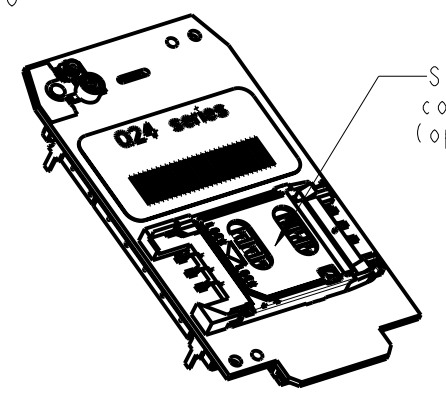
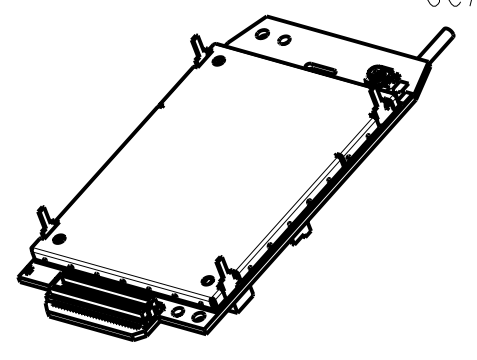
Figure 5: Mechanical drawing of the Wireless CPU series +SIM CARD holder



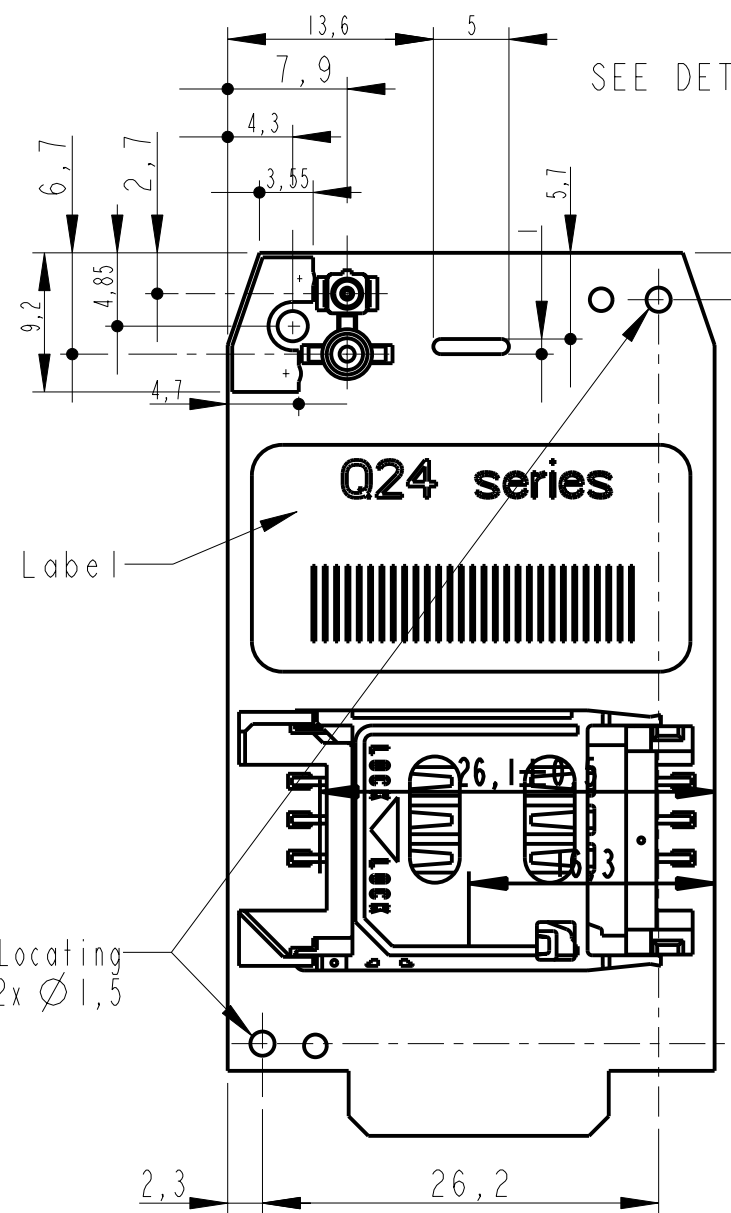
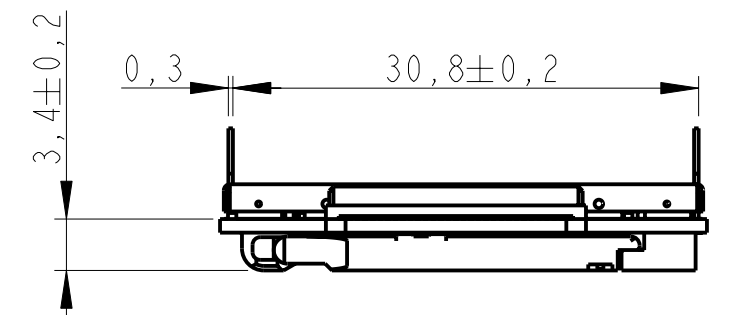
Caution:

Customers are advised to verify that the SIM Card environmental specification used is compliant with the Wireless CPU Q24NG environmental specifications. Please refer to [8] Wireless CPU Q24NG Product Technical Specification WM_PRJ_Q24NG_PTS_001. Any application must be qualified by the customer with the SIM Card in storage, transportation, and operation.

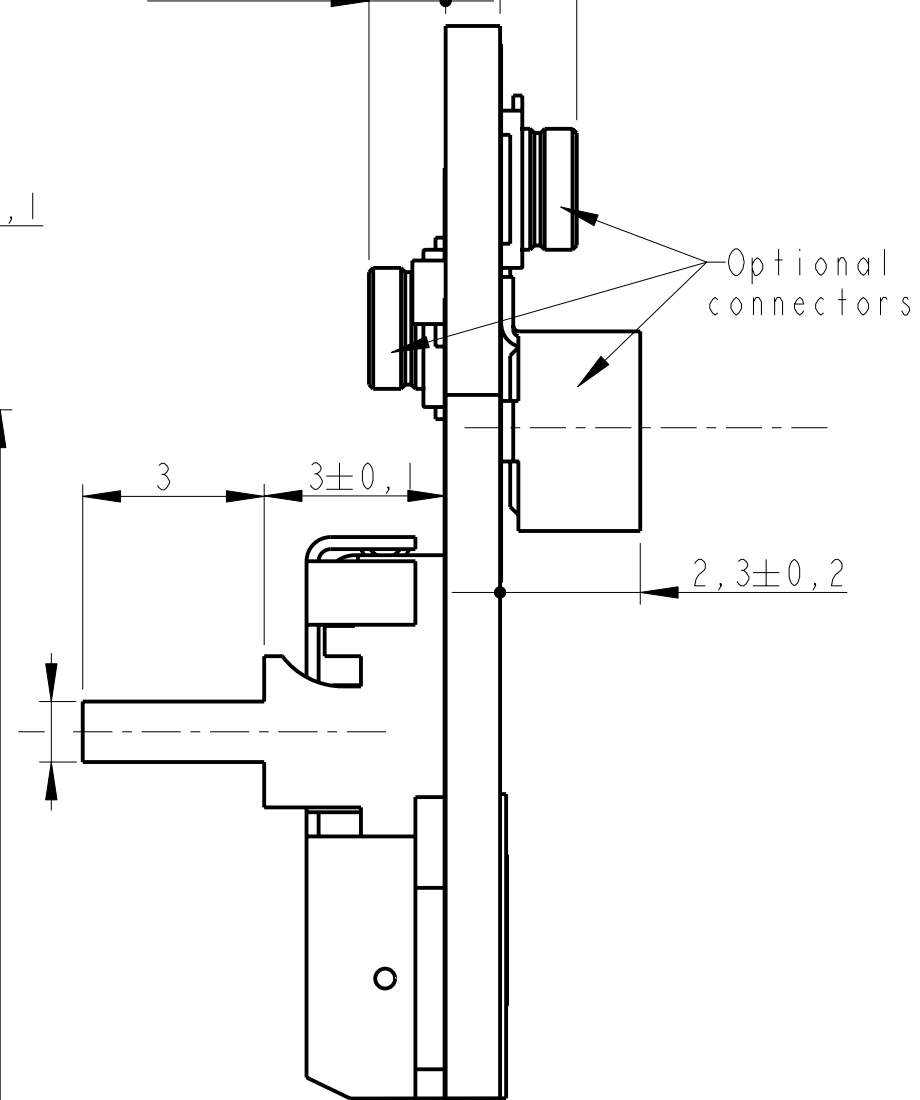
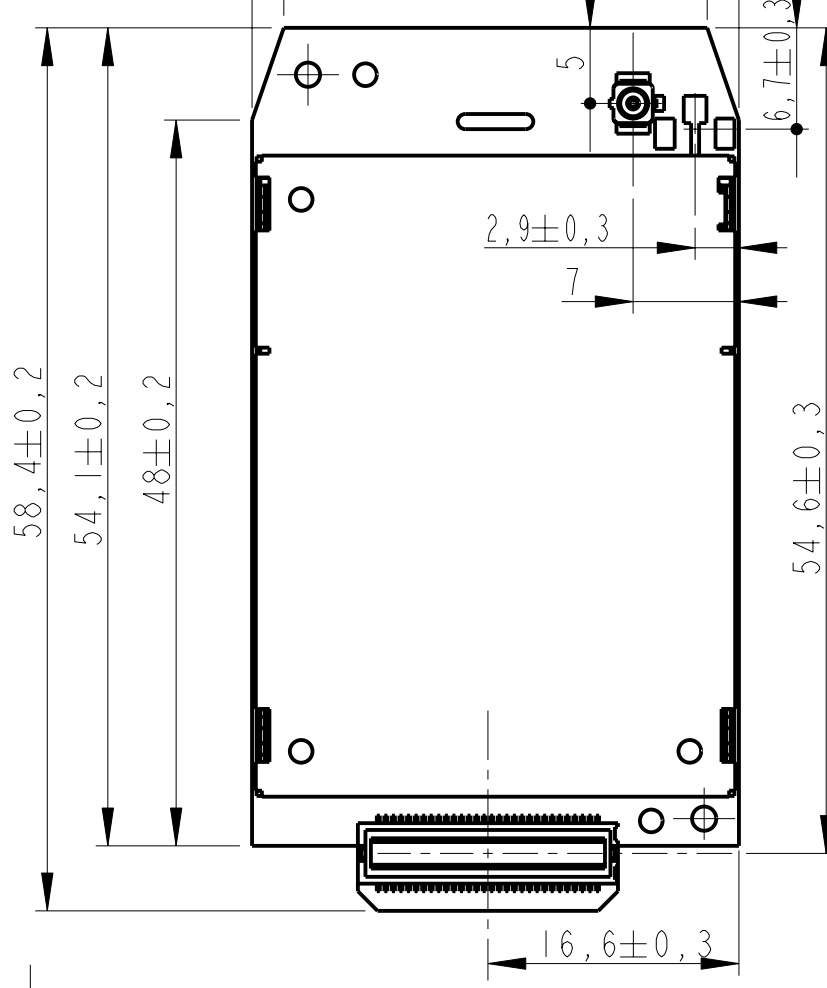
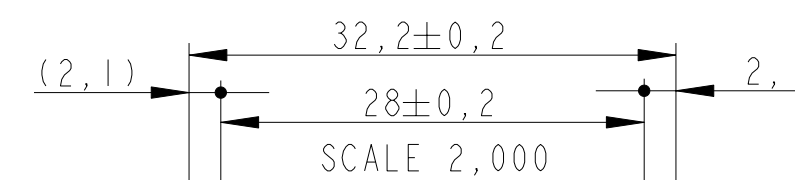
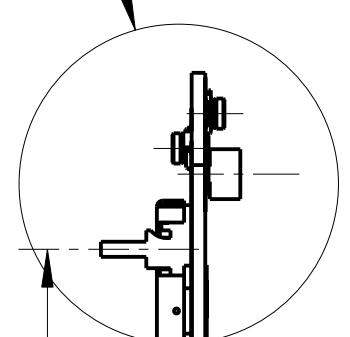
SCALE 1,000



SIM card connector (optional)



SEE DETAIL A



DETAIL A SCALE 8,000

Locating 2x Ø1,5

Label

Q24 Series	GEN.TOL. : ±0,3		SCALE : 1,000
MODULE DIMENSIONS	DOC.	FOLIO: 1/1	FORMAT : A3
WM-3-600101-V-003-A			

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AUTHOR : JPM

RESPONS : ASC

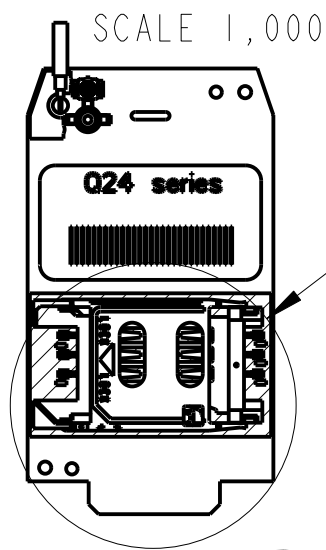
Sim holder update	28/09/06	JPM	ASC	Production	B
Creation	03/08/06	JPM	ASC	Production	A
MODIFICATION	DATE	AUTHOR	RESP.	STATUS	IND

PRO/ENGINEER MODULE

IND.



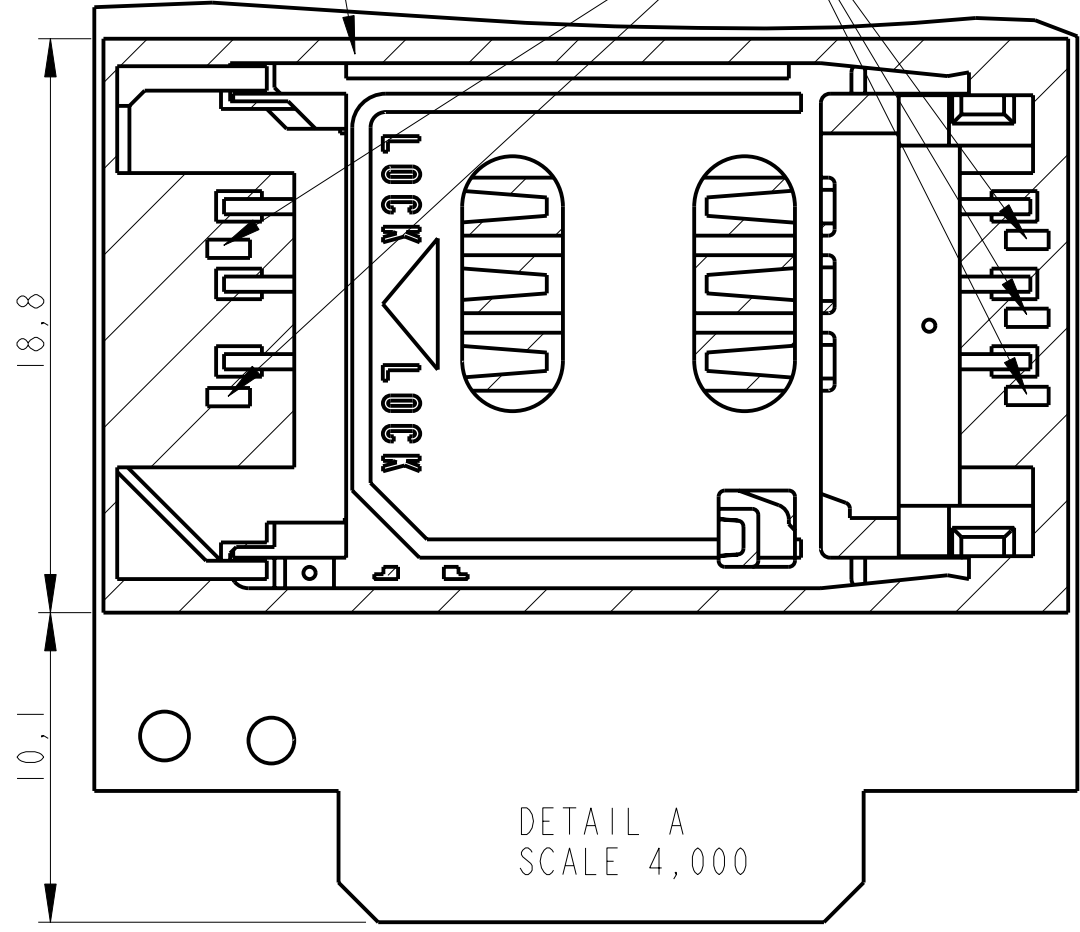
MODIFICATION	DATE	AUTHOR	RESP.	STATUS	IND
Creation	29/09/06	JPM	ASC	Production	A



SEE DETAIL A

Area without components

ESD protectors



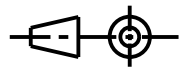
18,8

10,1

DETAIL A
SCALE 4,000

ESD PROTECTORS

TOL.GEN.: ±0,3



SCALE: 1,000

Q24_SERIES

FOLIO : 1/1

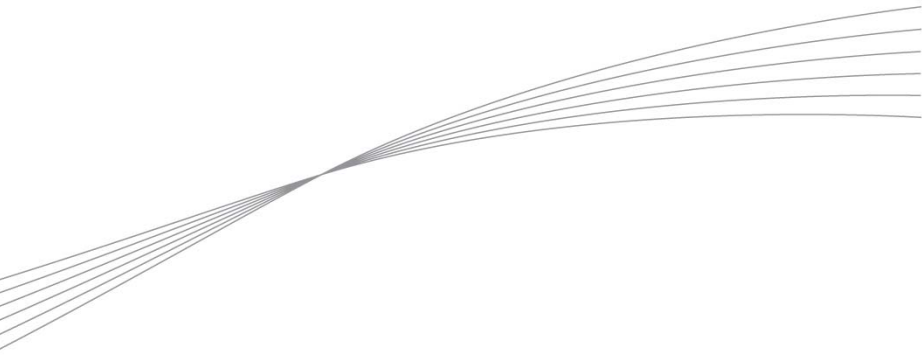
WM-4-600101-X-017-A

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A

PRO/ENGINEER

IND.



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