Sontex Thermal Energy Flow Metering

Manual

Radio Central

Supercom 646

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Manufacturer: Sontex SA
2605 Sonceboz, Switzerland
Phone: +41 32 488 30 00
Fax: +41 32 488 30 01
Email: sontex@sontex.ch
Internet: www.sontex.ch

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Table of Contents

1. General remarks

1.1 Introduction

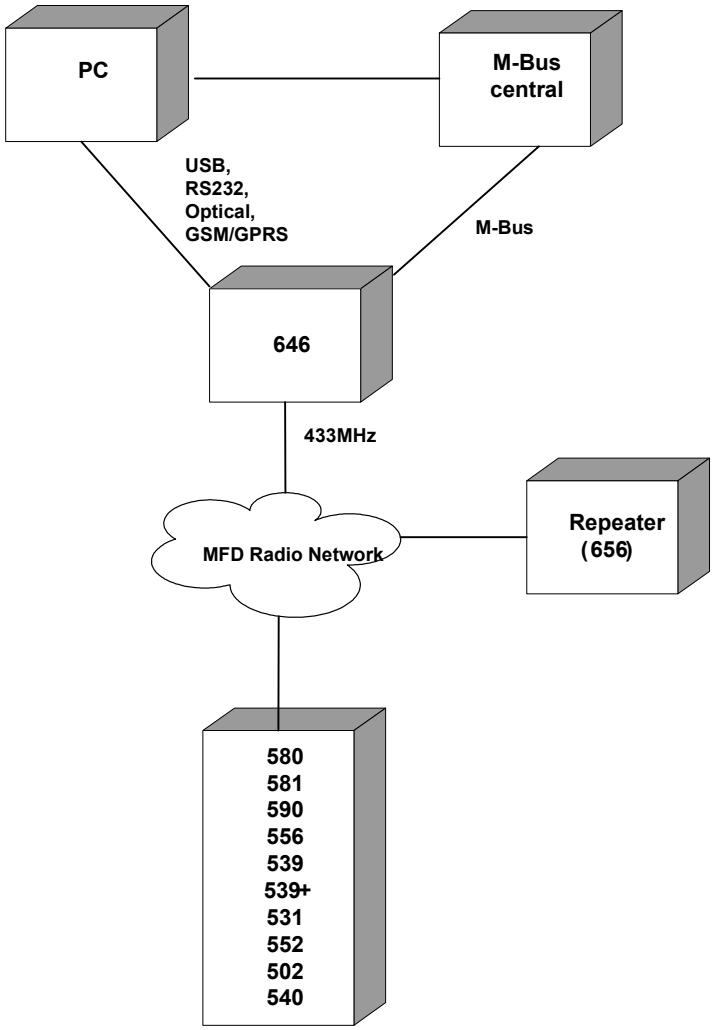
This manual describes the function and use of the radio central ***Supercom 646***. It addresses the questions of both users and engineers.

1.2 Area of use of the radio central

The Supercom 646 radio central gathers radio data supplied by radio meters. The Supercom radio central can be read via a USB or RS232 interface, optically, by an M-Bus or GSM/GPRS and allows radio reception of the following Sontex products:

- Radio Heating Cost Distributor 502s / 552 / 556
- Radio Water Distributor 590
- Supercal 539 Compact Energy Meter with radio option
- Supercal 531 Integrator with radio option
- Radio Module 540 (2 entries max.) / Supercom 541
- Supercom 580 / 581 Radio Module

The communication peripherals of the Supercom 646 radio central are conceived for connection to a computer through a USB, RS232, Optic, M-Bus or GSM/GPRS interface. The Supercom 646 allows the radio reception of different meters. The radio modem works at a frequency of 433.82 MHz and supports MFD and Radian 0 protocols.



2. Shipment contents

The Supercom 646 Radio Central shipment contains:

- Supercom 646 Radio Central with the power module.
- 1 plastic support for a DIN track
- 4 screws with washers and 4 pads to fix the central to a wall.
- 2 lead seals to lock the removable cover.
- 1 bridge to activate the power batteries.
- 1 antenna.
- Manuel
- CD with Supercom with, among other:
  Tools646 Software
  Tools646 User guide (PDF)

3. Radio central installation

3.1 Attaching the antenna

Take the antenna in the plastic bag and screw it on the SMA connector located on the side of the base. Make sure that the screw of the antenna connector is tight to ensure a connection without signal loss.

3.2 Attachment of the central

3.2.1 Wall attachment

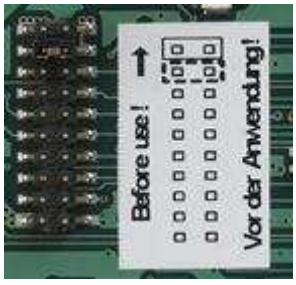
The Supercom 646 Radio Central can be fixed horizontally or against a wall on the four supports using the screws and pads provided. To remove the upper cover of the base, remove the cover and remove the screw that attaches the two parts. Remove the upper case cover and attach the lower part containing the electronic card using the four screws. The central can also be fixed to a DIN track using the plastic support situated on the back of the lower part of the case.

3.3 Power

3.3.1 Activating the power main

The module power cable or battery must be connected to the connector on the motherboard.

3.3.2 Activation of the batteries mounted on the motherboard



During the installation of the central, the batteries must be connected. In order to do this, one must place the jumper on the two pins of the first line of the connector of the motherboard. When the bridge is closed, the central is powered by the battery/batteries and the green and orange LEDs flash three times simultaneously. From this moment on, the central can be configured via the selected interface by the configuration software linked to the central.

If using a radio central with GPRS module initially insert the SIM card before activating the battery/batteries with the jumper.

3.3.3 Battery power module for 52 data collections a year

The battery power module is set for maximum 52 data collections a year for a period of 10 years for the radio reception of 500 radio devices or 24 data collections a year for 1000 radio devices.

3.3.4 Mains power supply module

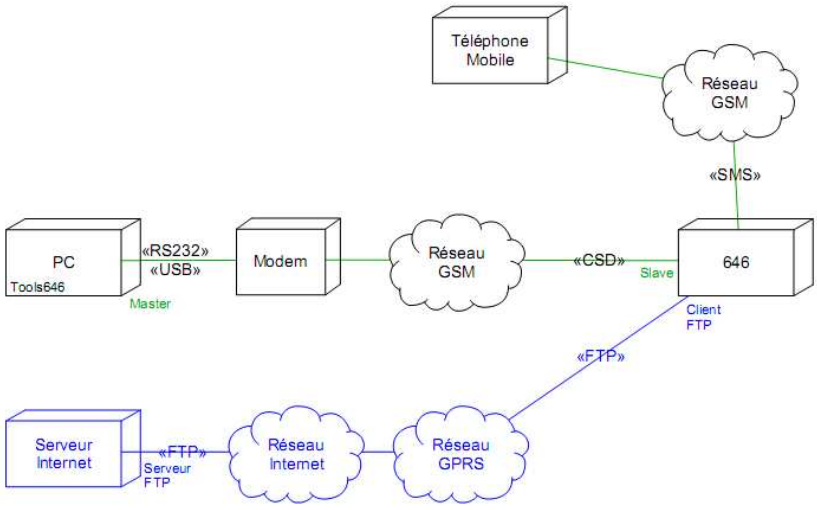
Pass the power cable through the cable hole of the lower part of the case and connect it to the power module terminal. The power module is connected by a cable to the motherboard of the central. Power is necessary with the use of a **GSM/GPRS module**. A backup battery is on the motherboard in case of a power failure.

3.3.5 GPRS module

The **GSM function** allows to connect to the radio central Supercom 646 by using the GSM network. This remote connection can be established through a computer connected to a modem.

The **GPRS function** allows sending data of radio devices read by the Supercom 646 on a FTP server via the GPRS network. It is also possible to send and receive SMS messages by the GSM network to see the status of the radio central. The functionalities through the GSM network are also possible.

If the central is equipped with a GSM/GPRS module, insert the SIM card in the SIM card holder and press the « Reset » - button located on the motherboard. A power source must be connected to the GSM/GPRS module that the activation happens correctly.



Together with the GPRS module it's important to choose the right subscription. Mobile communications services may greatly vary between countries and providers.

Installation procedure of GPRS module

This procedure describes the 1st commissioning of the radio central.
Before any manipulation, ensure that the mains power supply is not connected and also the jumper is not connected to the jumper position 2 on the motherboard. If the bridge is open, the central is not powered by the battery/batteries (see chapter 3.2.2).
Proceed as follows:

- Insert the SIM card in the SIM card holder on the GPRS module.
- Set the jumper to position 2 on the motherboard. If the bridge is closed, the central is powered by the battery/batteries (see chapter 3.2.2)
- Connect the radio central to the computer with the UBS or RS232 cable. Read the configuration of the radio central with the software Tools646.
- In the tab « *General Settings* » of the Tools646 set the date and time of the radio central.
- In the tab « *Communication* » go to the panel «*Module 2* », and introduce the PIN code of the SIM card of the GPRS module. Other information like GSM / GPRS / FTP / SMS, reading periods and the list of devices can be introduced at the same time or later.
- Program the radio central with these information.
- Connect the power cable to the mains power supply module.
- Close the radio central Supercom 646 with the cover
- Connect the power cable to the power plug in the wall.

Once the radio central is set up and powered, the GSM / GPRS module tries to connect to the GSM network. This may take up to 1 minute. Once connected to the GSM network the orange LED of the module will flash every 3 seconds.

Remark:
Make sure that the correct PIN code of the SIM card is available to be introduced with the software Tools646.
In case an incorrect PIN code was introduced, an error will be recorded in the radio central for the GPRS module and visible with the software **Tools646** (field "Error" of the GPRS Module).
After three retries with a incorrect PIN code the GPRS will be blocked and can only be released with the PUK code.
For this, please insert the SIM into a mobile phone and then enter the PUK code (this operation is not realizable by the Tools646).

3.3.6 Mobile phone subscription required with the GPRS module

To cover all functionalities of the GPRS module, the mobile phone subscription of the SIM card must cover the following functions/features:

M2M Data Exchange:
Machine-to-machine (or M2M) is increasingly being used in a variety of different sectors optimizing and accelerating processes of interconnection of several GSM/GPRS modules.

Internet Access
The GPRS module needs an internet access. The GPRS module plays the role of the ***HTTP Client*** and ***FTP Client***.
A basic GPRS subscription with *Public Internet Access* is enough.
Subscriptions with *CAA (Corporate Application Access)* and *CNA (Corporate Network Access)* can also be used without providing additional functionally to the GPRS module.

CSD communication
That the radio central can be called, the GPRS subscription of the SIM card must be able to receive incoming calls via its own number (CSD MT or CSD incoming).

In case the subscription doesn't provide CSD MT it is possible to use the ***Call-Back*** function of the radio central Supercom 646. For this an *output channel* or *CDS MO*, and an outgoing voice channel is necessary with the subscription.

SMS sending
The mobile phone subscription must also allow sending and receiving SMS messages in GSM text format with 160 characters per SMS.
The module cannot concatenate several SMS messages for the send or receive functions.

See annexe D

The user guide of the software Tools646 contains different commands to install / configure / test a radio central Supercom 646 according to the communication interface used.

3.3.7 M-Bus module

Connect the M-Bus transmission cable to the terminal on the module and fix it to the module using a strap.

3.4 Closing and sealing the case

At the end of the Supercom 646 Radio Central installation, the case of the central must be closed by starting with the power side in order to be careful with the 2 insertion connectors. The male connectors of the cover must be in line with the female connectors of the lower part of the case. To do this, one must slide the covers together. Tighten the fixation screw of the two covers and then insert the lead seal in the opening on the upper cover of the case. Once the seal is fixed, the Supercom 646 Radio Central can't be opened without breaking the seal. The access to the USB or RS-232 interfaces is not possible after the sealing.

3.5 Configure the radio central

The parameter configuration of the Supercom 646 Radio Central can be done with the software **Tools646** supplied by Sontex. The software documentation is delivered with the software (Tools646 User guide). The configuration can be done with the optical interface or with the communication mode installed in the central (USB, RS-232, M-Bus or GPRS). Configuration access is protected by a password. On top of the running of radio devices, the following parameters can be defined and modified by the software Tools646:

- Number identification of the radio central.
- Time and date (must be initialized before doing a radio device data collection)
- Time and date of the radio device data collection.
- Transmission speed depending on the type of interface, M-Bus, computer or modem.
- PIN code of the GPRS modem and call-back number of the call-back function if used.
- Password modification for writing protection.
- Changing the password.
- Radio central firmware update.

3.5.1 Starting the radio central with the software Tools646

- Adjust the time and the date of the radio central to winter time.
- Create or save a radio device list to read.
  Once the radio central is programmed, the radio communication between the central and the different radio devices must be tested.
- Program an immediate reading according to the list contained in the central.
  Verify that all the radio devices have been read correctly. If this is the case, the radio central is properly configured and placed to collect data.
- Program the data collection dates from the radio devices.

For detailed information we refer to the Tools646 User Guide EN.

4. Radio device data collection and periods

Only Sontex Radio devices can be read by the Supercom 646 Radio Central.
Radio devices can be read 7 days a week depending on the radio schedule of each product type (except the devices 502/502S/552 and 540 whose date and time of reading varies according to the type of the device). To set the read out schedule, please refer to the tab “Collection Date” of the Tools646 software.
With an automatic data collection configuration, the radio central Supercom 646 will start the reading of the devices contained in the list from 18:15 of the selected date.

4.1 Radio schedule

During a radio data collection, the time of the device questioned by the central will be automatically synchronized with the time of the radio central Supercom 646. It is therefore important to carefully verify that the time of the radio central has been initialized with winter time.

Product		Final digit serial number	UTC + 1 (Winter Time) by default, but can be changed																						
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
502	552																									
502s	552	0																								
502s	552	1																								
502s	552	2																								
502s	552	3																								
502s	552	4																								
502s	552	5																								
502s	552	6																								
502s	552	7																								
502s	552	8																								
502s	552	9																								
540																										
556	590	0																								
556	590	1																								
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556	590	4																								
556	590	5																								
556	590	6																								
556	590	7																								
556	590	8																								
556	590	9																								
539	> SW 1.6																									
539	≥ SW 2.3																									
531																										
580	581																									
	541																									

Ready, 7 days a week, all year round

Ready, Mo-Fr, 16.6-15.7 by default, but can be changed.

Every 3rd second, Mo-Fr, all year round

Ready, Mo-Fr, all year round

4.2 Saving data

Data is saved in the non-volatile flash memory of the radio central. Supercom 646. This memory contains the configuration parameters of the radio central Supercom 646, the list of devices to read, the data of the last readout as well as the firmware version of the radio central Supercom 646.. The radio central Supercom 646 is equipped with a memory that can stock up to 1000 radio devices.

The following Sontex products can be read:

- Radio Heat Cost Allocator 502s / 552 / 556
- Radio Water Allocator 590
- Supercal 539 Compact Heat Meter with radio option
- Supercal 531 Integrator with radio option
- Radio Pulse Module 540 (max 2 entries.) / Supercom 541
- Supercom 580 / 581 Radio Module

5. Description of Light Emitting Diodes (LED)

The Supercom 646 Radio Central is equipped with 2 LEDs:

- A green LED to indicate power and communication
- An orange LED to indicate device data errors.

This error can mean that the central clock is invalid or non-initialized, that the data or the memory is damaged.

5.1 LED display

The state of the two LEDs allows the definition of the Supercom 646 Radio Central's current mode and status as indicated below:

Status		**Main power supply 230V**	**Battery power supply**
Initialization		Green LED and orange LED: 3 simultaneous blinks for 0,5 second, each second.	
Radio test mode		Green LED: blinks for 0,5 second, each second. Orange LED: blinks alternately.	
Sleeping Mode	Normal	Green LED: ON Orange LED: OFF	Green LED: blinks for 40 ms every 4 seconds. Orange LED: OFF
	Time or memory is not available	Green LED : OFF Orange LED: ON	Green LED: OFF Orange LED: blinks for 40 ms every 4 seconds.
During communication. (Optical 3x) (Fixed Interface 2x, (Mobile 1x)	Normal	Green LED: blinks for 0,5 second each second. Orange LED: OFF	
	Time or memory is not available	Green LED: OFF Orange LED: blinks for 0,5 second each second.	
GPRS and during data collection	Normal	Green LED: OFF Orange LED: OFF	
After each radio device data collection	Correct Reading	Green LED: blinks for 0,5 second once for each device read. Orange LED: OFF	
	Incorrect Reading	Green LED: OFF Orange LED: blinks for 0,5 second once for each device not read.	

OFF = LED off; ON= LED on

5.2 GPRS Module, description of LED

The GPRS module is equipped with an Orange LED that can be seen if the cover of the radio central is removed.

The flashing sequence of this LED is defined as follows:.

GPRS Network	Connect	Orange LED: blinks for 40 ms every 3 seconds
	Not connect	Orange LED: blinks for 40 ms every (1 s) second.

5.3 Power supply problems

In case of power supply problems (network or battery), the two LEDs indicate the problem.

5.3.1 Power network stopped or low battery power:

Status		**230V Network Power Stopped**	**Low Battery Power**
Sleeping Mode	Normal	Green LED: blinks for 40 ms every 8 seconds. Orange LED: OFF	
	Invalid Clock or Memory	Green LED: OFF Orange LED: blinks for 40 ms every 8 seconds.	

5.3.2 Power Battery or Backup Battery Discharged:

Status		**Backup Battery Discharged**	**Power Battery Discharged**
Sleeping Mode	Normal	Green LED: blinks 2x for 40 ms every 8 seconds. Orange LED: OFF	
	Invalid Clock or Memory	Green LED: OFF Orange LED: blinks 2x for 40 ms every 8 seconds.	

6. General instructions

- The Supercom 646 Radio Central must only be installed by authorized persons.
- The technical specifications of the Supercom 646 Radio Central must be respected.
- The lower part of the radio central case is made to be laid flat or fixed to a wall. The attachment to a wall can be done with four screws or a DIN track.
- The Supercom 646 Radio Central can be installed horizontally or vertically in an area free of metallic obstacles.
- Radio data transmission quality depends on the wave propagation of the radio central installation site, the radio connections of the different radio devices as well as atmospheric and geographic conditions (in particular in enclosed areas or so-called dead zones)
- Radio communication cannot be guaranteed at any time and anywhere. The user must check the radio propagation conditions at the planned installation spot of the radio central Supercom 646.
- Keep heat emissions or electrical fields far from the radio central Supercom 646
- The radio central Supercom 646 must not be exposed to humidity.
- The connection of the power cable to the terminal must be as short as possible.
- Avoid electrostatic discharges during installation or manipulation. Before touching the radio central or a communication interface, one is advised to touch a ground such as a hot water pipe to discharge oneself of any static electricity.
- With the option of the power network module, be careful with high tension power sources.
- Avoid touching accessible electronic circuits or contacts.
- The RS232 interface cable must not be longer than 5 meters.

6.1.1 Power network stopped or power battery discharged

In case of an electrical breakdown or a dead battery, the clock of the central is always active while all radio communications are deactivated. It is no longer possible to collect radio device data contained in the radio central list but it is always possible to question the radio central Supercom 646 and read the data of the devices contained in the radio central optically or by the other wireless methods available.

6.1.2 Care of the batteries

The batteries must not be opened, be in contact with water or short circuited. Empty batteries must be eliminated in appropriate collection points. Battery life depends strongly on temperature. Therefore, the Supercom 646 radio central must be installed far from sources of heat or cold. The 2 3V format A batteries used with the battery powered module soldered to the motherboard must be identical and correspond to the batteries delivered by the manufacturer. If another battery than the one recommended by Sontex is used, there could be a danger of explosion.

6.1.3 Changing batteries

If changing batteries, it is imperative only to use the same type of battery.
Always double check with Sontex.

6.1.3.1 **Procedure to change the batteries**

Mains power supply:

If the radio central is powered with mains supply unplug the power cord from the power plug before changing the backup battery. Cut the Nylon strap around the backup battery to release it from the mother board and replace it with a new one of the exact same specification. With a new Nylon strap fix the battery tight through the hole in the mother board and around the battery.
Always press the reset button after a battery change, close the cover, protect the radio central with a new seal and plug the power cord back in the power plug.

Battery powered:

If the main battery is discharged cut the Nylon strap to release the mains battery from the bottom of the radio central and disconnect the connection cable that connects the main battery to the motherboard. Replace the battery with a new one of the exact same specification and with a new Nylon strap fix the battery tight through the hole on the bottom of the radio central and around the battery. Reconnect the connection cable.
If the backup batteries are discharged cut the Nylon strap around the backup battery to release it from the mother board and replace it with a new one of the exact same specification. With a new Nylon strap fix the battery tight through the hole in the mother board and around the battery.
Always press the reset button after a battery change, close the cover, and protect the radio central with a new seal.

6.1.3.2 **Reset of elapsed time meter**

If the radio central is mains powered the elapsed time meter records the **running hours of backup battery.**
If the radio central is **battery powered** the elapsed time meter records the operating hours of the main battery.
After changing mains or backup battery it is recommended to reset elapsed time meter of the batteries.
Reset the elapsed time meter with the software Tools646 in the tab « *General Settings* », and the function « *Reset* ».

Elimination Advice

The batteries and the Supercom 646 Radio Central must be eliminated in a way that protects the environment and must be returned to the manufacturer for elimination. In this way, we can deal with the components following prescriptions for battery and electronic waste elimination. If you do the elimination, inform yourself of recycling possibilities in your area.

6.1.4 Connection of the mains power module

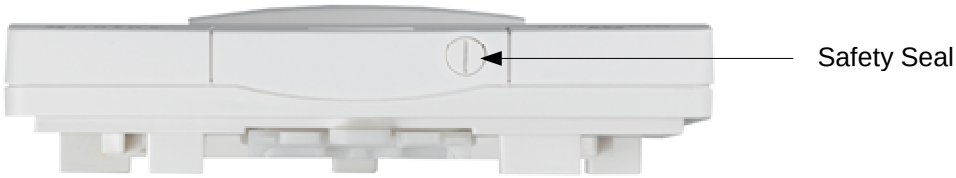
The connection must be done by an authorized person and must be conform to national and international standard and local security laws.
The mains power supply must be protected with a fuse of 2 -10 A. The power cable must be installed that no hot sources (e.g. pipes, vans) over 70℃ interfere with the power cord to avoid any damages of the housing.
Use only power cords with wires with a cross section of > 0,75 mm^2 to 1,5 mm^2.

6.1.5 Safety instructions

The Supercom 646 Radio Central left the factory in a perfect state of functioning and safety. To maintain this state and to guarantee optimal safety, the user must respect the instructions contained in this document. When opening the upper cover or removing protective parts, remember that elements could be live. All repairs and service work must be done by persons specialized for this kind of equipment. If the cases and/or the power cable show signs of damage or an anomaly, the Supercom 646 Radio Central must be disconnected and protected against any accidental re-opening.
The maximal functioning temperature is 55℃. If the surrounding temperature goes above this maximum, the component and battery life will be negatively affected.
To protect the radio central against dirt and damage, the packaging should only be removed during the installation. For cleaning, a moist cloth is sufficient. Do not use solvents. The connecting and linking cables must not be fixed to or insulated on pipes in the installation area.

6.2 Safety seal

In order to protect the Supercom 646 Radio Central against any unauthorized handling, the central is equipped with a safety seal to guarantee that the central has not been opened. The safety seal shall only be broken and removed by competent persons. If this is not respected, the guarantee is void.



6.3 Technical Data

General

- Operating temperature 5°- 55℃
- Storage temperature -10°- 60℃ (dry environment)
- Weight 0.340 Kg (Power supply 230VAC + GSM + RS232).

Housing

- Protection class according DIN 40050 IP 40 (except the bottom for the passage of cables)

Dimensions

- Housing dimensions 180x154x46 mm

Interface de communication available

- Optical interface is installed by default on each radio central Supercom 646.
- USB
- M-Bus
- GSM/GPRS

Radio communication

- Communication Bi-directional
- Modulation FSK
- Frequency 433.82 MHz
- Radio protocol Radian 0
- Data transmission EN 60870-5 (M-Bus)
- PER 10 mW
- Range on free field ca. 300 m
- Range in buildings approx. 30 m*

* Values depend on the structure of buildings
Due to physical conditions, the transmission and reception ranges can vary (Influence of temperature, humidity, atmospheric pressure

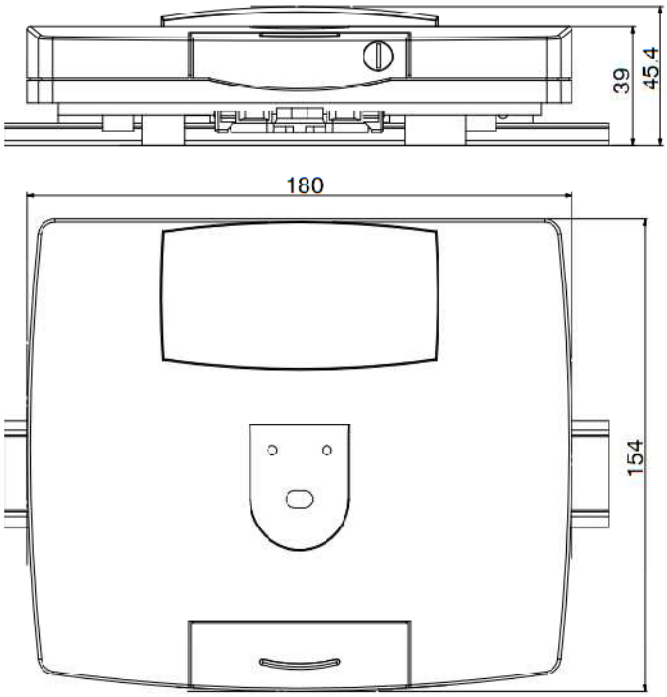
Electronic Characteristics

- Network Power Module Backup Battery:
  3V Lithium Manganese Dioxide (Li-MnO2) format $^{2}/_{3}$ A
- Power Module Batteries :
  3,6V Lithium Thionyl Chloride (Li-SOCI2) format D + 2 x 3V format A (soldered to the mother-board).

GPRS subscription requirements for mobile phone:

- M2M data exchange
- Internet access
  The GPRS module plays the role of the ***HTTP Client*** and ***FTP Client***.
  A basic GPRS subscription with *Public Internet Access* is enough.
  Subscriptions with *CAA (Corporate Application Access)* and *CNA (Corporate Network Access)* can also be used without providing additional functionally to the GPRS module.
- CSD communication
  To be called, the GPRS subscription of the SIM card must be able to receive incoming calls via its own number (CSD MT or CSD incoming).
  If the subscription provides an *output channel* or *DSF MO*, and an outgoing voice channel, it is possible to use the redial function of the central Supercom 646.
- SMS sending and receiving in GSM text format with 160 characters per SMS.

6.4 Dimensions



Interior view

Supercom 646 Batterie, USB

Supercom 646, main power supply 230 VAC, USB, GPRS

View from the bottom with DIN rail holder.

7. M-Bus communication protocol

7.1 Introduction

The Supercom 646 Radio Central uses the M-Bus European Norm EN1434 protocol to communicate.
The M-Bus protocol supports a secondary addressing. For more information, please refer to the M-Bus documentation on the internet at the following site: http://www.m-bus.com/

7.2 Memory distribution of the central

The memory of the radio central can be defined by three distinct parts. Each of these parts can be addressed according to the M-Bus protocol in reading and writing or only in reading.

1. Data containing the configuration of the central (reading and writing)
2. Data containing the list of memorized devices (reading and writing)
3. Data containing the data of devices read by the central (reading)

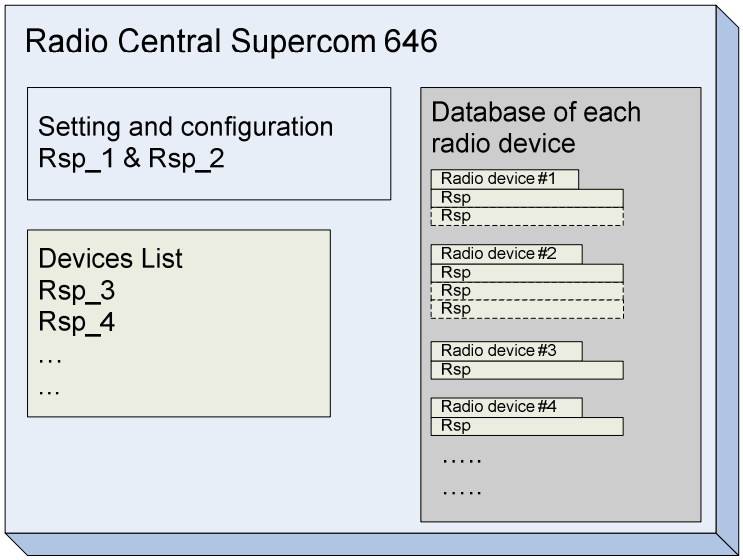
7.3 Reading concept

The radio central is seen as 2 distinct devices:

1. The central itself.
2. The read device whose read data is saved in the memory of the central.

The Supercom 646 sends several blocks. The 2 first blocks are dedicated for the central. The following blocks depend on the amount of radio devices contained in the list of the radio central:

1. Frames n°1 and n°2 for the central
2. Frames n°3…n°xx contain the list of radio device s read by the central. There are four devices per frame.



7.3.1 Instructions for a reading of the configuration and the device list of the radio central

Cf. Annex A, page 33, for the detailed schema of the reading process.

1. Frame request “Rsp_1” with “REQ_UD2” (Adr.253).

Frame “Rsp_1”

					<MbusRecord> XML attributes					
					Name	SubUnit	Tariff	Storage	Function‡	Parent tag
	Field	Frame bytes in hex (Note 1)	Coding	Comment						
Start	Start, Length	68,Le Le,68								
	Control	08		Respond with user data, RSP_UD						
	Address	FD								
User Data	Control Information	72		Variable structure respond						
	Identification number	xx xx xx xx	A, 32 bits		IdentificationNumber					<Header>
	Manufacturer ID	EE 4D	C, 16 bits	"SON"	Manufacturer					
	Version of meter	0C	C, 8 bits	12	Version					
	Device type	0E	D, 8 bits	Bus / System component	DeviceType					
	Access number	xx	C, 8 bits		AccessNumber					
	Status	st	Ds, 8 bits		Status					
	Signature	00 00	C, 16 bits	Not used	Signature					
	Detailed errors	02,FD 17,er er	D, 16 bits		ErrorFlags	0	0	0	0	<Records>
	Current date & time	04,6D,xx xx xx xx	F, 32 bits		DateAndTime	0	0	0	0	
	Day of week	01,FD 63,xx	C, 8 bits	1: Monday, 7: Sunday	DayOfWeek	0	0	0	0	
	Time Zone	01,FF 1F,xx	B, 8 bits	§, xx*15 min;	TimeZone	0	0	0	0	
	Battery use duration	03,FD 6C,xx xx xx	B, 24 bits	[hour]	OperatingTimeBattery	0	0	0	0	
	Reading date 1	44,6D,xx xx xx xx	F, 32 bits		DateAndTime	0	0	1	0	
	Reading period 1	41,FD si,xx	C, 8 bits	[day | month]	StorageInterval	0	0	1	0	
	Reading options 1	41,FD 66,op	D, 8 bits		StateOfParameterActivation	0	0	1	0	
	Reading date 2	84 01,6D,xx xx xx xx	F, 32 bits		DateAndTime	0	0	2	0	
	Reading period 2	81 01,FD si,xx	C, 8 bits	[day | month]	StorageInterval	0	0	2	0	
	Reading options 2	81 01,FD 66,op	D, 8 bits		StateOfParameterActivation	0	0	2	0	
	Reading date 3	C4 01,6D,xx xx xx xx	F, 32 bits		DateAndTime	0	0	3	0	
	Reading period 3	C1 01,FD si,xx	C, 8 bits	[day | month]	StorageInterval	0	0	3	0	
	Reading options 3	C1 01,FD 66,op	D, 8 bits		StateOfParameterActivation	0	0	3	0	
	Reading date 4	84 02,6D,xx xx xx xx	F, 32 bits		DateAndTime	0	0	4	0	
	Reading period 4	81 02,FD si,xx	C, 8 bits	[day | month]	StorageInterval	0	0	4	0	
	Reading options 4	81 02,FD 66,op	D, 8 bits		StateOfParameterActivation	0	0	4	0	
	Reading date 5	C4 02,6D,xx xx xx xx	F, 32 bits		DateAndTime	0	0	5	0	
	Reading period 5	C1 02,FD si,xx	C, 8 bits	[day | month]	StorageInterval	0	0	5	0	
	Reading options 5	C1 02,FD 66,op	D, 8 bits		StateOfParameterActivation	0	0	5	0	
	Date of last reading	C4 0F,6D,xx xx xx xx	F, 32 bits		DateAndTime	0	0	31	0	
	Radio reading counter	C3 0F,FD 08,xx xx xx	C, 24 bits		AccessNumber	0	0	31	0	
	Number of devices in the list	02,FD 22,xx xx	C, 16 bits		SizeOfStorageBlock	0	0	0	0	
	Number of devices with available data	82 B0 30,FD 22,xx xx	C, 16 bits		SizeOfStorageBlock	0	15	0	0	
	Remaining attempts of current radio reading	01,FD 1E,xx	C, 8 bits	0: the radio reading is finished	Retry	0	0	0	0	

User Data	Maximal number of attempts to read by radio	11,FD 1E,xx	C, 8 bits	Must be >= 1	Retry	0	0	0	1	<Records>
	Optical baudrate	03,FD 1C,xx xx xx	C, 24 bits	[bit/s]	BaudRate	0	0	0	0	
	Optical byte format	01,FF 0F,bf	C, 8 bits	§	ByteFormat	0	0	0	0	
	Optical general timeout	02,FF 12,xx xx	C, 16 bits	§, [1/2 s]	Timeout	0	0	0	0	
	Optical inactivity timeout	82 10,FF 12,xx xx	C, 16 bits	§, [1/2 s]	Timeout	0	1	0	0	
	Optical byte interval	82 20,FF 10,xx xx	C, 16 bits	§, [1/32768 s]	Timeout	0	2	0	0	
	K1 module type	81 40,FF 1D,mt	C, 8 bits	§	InterfaceType	1	0	0	0	
	K1 module baudrate	83 40,FD 1C,xx xx xx	C, 24 bits	[bit/s]	BaudRate	1	0	0	0	
	K1 module byte format	81 40,FF 0F,bf	C, 8 bits	§	ByteFormat	1	0	0	0	
	K1 module general timeout	82 40,FF 12,xx xx	C, 16 bits	§, [1/2 s]	Timeout	1	0	0	0	
	K1 module inactivity timeout	82 50,FF 12,xx xx	C, 16 bits	§, [1/2 s]	Timeout	1	1	0	0	
	K1 module byte interval	82 60,FF 10,xx xx	C, 16 bits	§, [1/32768 s]	Timeout	1	2	0	0	
	Parameter flags	01,FD 66,pp	D, 8 bits		StateOfParameterActivation	0	0	0	0	
	Device write protect	01,FF 04,wp	D, 8 bits	§	DeviceWriteProtect	0	0	0	0	
	Internal version	0C,FD 0F,xx xx xx xx	A, 32 bits		OtherSoftwareVersion	0	0	0	0	
	Hardware version	02,FD 0D,xx xx	C, 16 bits		HardwareVersion	0	0	0	0	
	Fabrication Number	0C,78,xx xx xx xx	A, 32 bits		FabricationNumber	0	0	0	0	
	More records in next telegram	mo		Start of manufacturer specific data	ManufacturerDataBlock					
End	**C**heck **S**um	cs								
	Stop	16								

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during

§ manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailled description in the Keys sheet.

2. Frame request “Rsp_2” with “REQ_UD2” (Adr.253).

Frame “Rsp_2” (contains configuration information of the central with the GPRS module or M-Bus)

					<MbusRecord> XML attributes					
	Field	Frame bytes in hex (Note 1)	Coding	Comment	Name	SubUnit	Tariff	Storage	Function‡	Parent tag
Start	Start, Length	68,Le Le,68								
	Control	08		Respond with user data, RSP_UD						
	Address	FD								
User Data	Control Information	72		Variable structure respond						
	Identification number	xx xx xx xx	A, 32 bits		IdentificationNumber					<Header>
	Manufacturer ID	EE 4D	C, 16 bits	"SON"	Manufacturer					
	Version of meter	0C	C, 8 bits	12	Version					
	Device type	0E	D, 8 bits	Bus / System component	DeviceType					
	Access number	xx	C, 8 bits		AccessNumber					
	Status	st	Ds, 8 bits		Status					
	Signature	00 00	C, 16 bits	Not used	Signature					
	K2 Detailed errors	82 80 40,FD 17,kr kr	D, 16 bits		ErrorFlags	2	0	0	0	<Records>
	K2 module type	81 80 40,FF 1D,mt	C, 8 bits	§	InterfaceType	2	0	0	0	
	K2 module baudrate	83 80 40,FD 1C,xx xx xx	C, 24 bits	[bit/s]	BaudRate	2	0	0	0	
	K2 module byte format	81 80 40,FF 0F,bf	C, 8 bits	§	ByteFormat	2	0	0	0	
	K2 module general timeout	82 80 40,FF 12,xx xx	C, 16 bits	§, [1/2 s]	Timeout	2	0	0	0	
	K2 module inactivity timeout	82 90 40,FF 12,xx xx	C, 16 bits	§, [1/2 s]	Timeout	2	1	0	0	
	K2 module byte interval	82 A0 40,FF 10,xx xx	C, 16 bits	§, [1/32768 s]	Timeout	2	2	0	0	
	K2 module GSM PIN code	8D 80 40,FF 18,Ln ch ch ch ch ch ch ch ch	LVAR, 0..8	§, Note 2, empty = disabled	PinCode	2	0	0	0	
	K2 module call back number	8D 80 40,FF 1E,Ln ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	LVAR, 0..16	§, empty = disabled	PhoneNumber	2	0	0	0	
	K2 Password for command by SMS	8D B0 40,FD 16,Ln ch ch ch ch ch ch ch ch	LVAR, 0..8	Note 2, empty = no password	Password	2	3	0	0	
	K2 GPRS APN (Access Point Name)	8D 80 50,FF 26,Ln ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	LVAR, 0..32	§	AccessPointName	2	4	0	0	
	K2 GPRS Username	8D 80 50,FD 12,Ln ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	LVAR, 0..16	Note 2	AccessCodeUser	2	4	0	0	
	K2 GPRS Password	8D 80 50,FD 16,Ln ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	LVAR, 0..16	Note 2	Password	2	4	0	0	
	K2 GPRS DNS IP Address	84 80 50,FF 28,xx xx xx xx	C, 32 bits	§	InternetProtocolAddress	2	4	0	0	
	More records in next telegram	mo		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	cs								
	Stop	16			Max frame size: 211 bytes					

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error state

§ manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailled description in the Keys sheet.
2. The password must be entered before to read this value, otherwise it is missing from the RSP_UD.

Keys

Optional record

`xx` Value LSByte first
`yy` Value MSByte first

`bf` Byte format

`bit1..0`	Data bit	10b: 7 bits data; 11b: 8 bits data
`bit3..2`	Stop bit	00b: 1 bit stop; 10b: 2 bits stop
`bit6..4`	Parity	000b: none; 001b: odd; 010b: even
`bit7`	*Reserved*	always 0

`ch` ASCII character

`cs` The value of Check Sum is calculated from arithmetical sum modulo 256 of

`er er` Detailed errors

	646	***M-Bus standard***
`bit0`	†	*Tamper*
`bit1`	†	*Battery low*
`bit2`	†	*External alarm*
`bit3`	†	*Battery cut*
`bit7..4`	†	*RSSI*
`0000b`	†	*RSSI not available*
`0001b`	†	*-100 dBm or less*
`0010b`	†	*-90 dBm*
`0011b`	†	*-80 dBm*
`0100b`	†	*-70 dBm*
`0101b`	†	*-60 dBm*
`0110b`	†	*-50 dBm*
`0111b`	†	*-40 dBm*
`1000b`	†	*-30 dBm*
`1001b`	†	*-20 dBm*
`1010b`	†	*-10 dBm*
`1011b`	†	*0 dBm*
`1100b`	†	*+10 dBm*
`1101b`	†	*+20 dBm or more*
`1110b`	†	*Reserved*
`1111b`	†	*Reserved*
`bit8`	SND_UD frame: unknown CI.	
`bit9`	SND_UD frame, structured write: unknown field.	
`bit10`	Access right violation.	
`bit11`	SND_UD frame, structured write: bad field size.	
`bit12`	Memory overflow.	
`bit13`	†	
`bit14`	Invalid time clock	
`bit15`	†	

`kr kr` K2 Detailled errors

`bit7..0`	†
`bit8`	No communication between central and K2.
`bit9`	Missing or invalid SIM card.
`bit10`	Missing or bad SIM PIN.
`bit11`	SIM PUK (or other code) requested.
`bit12`	K2 was not registered to GSM network at startup.
`bit13`	Initialization pending. Need a reset if an error was occured.
`bit14`	Error during the last FTP echange (upload and/or download)
`bit15`	Error during the last clock adjustment by HTTP Time Server

`Le` Length of the M-Bus frame. The fields Start, Length, Check Sum and Stop (6 bytes) are not included in the calculation of the Length field. The Length field is **repeated twice** preceded and followed by the Start field 68h.

`Ld` Length of the special record "Device entry"

`18..46`

The first byte following the length is the LSB of the "Identification Number".

`Ln` Length of the ASCII character string

The allowed range is indicated in the "Coding" column.

Warning: according to the M-Bus standard, the first byte following the length byte is the rightmost character of the string, and the last byte is the leftmost character.

`mo` More records in next telegram :

`0Fh`	no
`1Fh`	yes

`mt` Module type

`2`	USB (slave)
`4`	M-Bus (slave)
`8`	GSM
`12`	RS-232 DCE
`14`	FTP-GPRS
`255`	No module plugged

`op` Reading Options

`bit0`	Clear the old reading data of all the devices prior to the new reading.
`bit1`	Ask the FTP-GPRS module to upload all the data stored in the central to the FTP server when the reading is complete.
`bit2`	Define when the upload starts after the end of the reading: 0: the upload start after a random delay of 0 to 60 minutes 1: the upload start immediately
`bit3`	Select the devices that will be read: 0: all devices 1: only the devices without data (the devices never read from the last clear)

`pp` Parameter flags

Warning: don't change the unused or reserved bits.

`bit0`	When the selected device is in the device list, but not yet read : 0: send an "empty" RSP_UD (with just the 12 bytes header) 1: do not send anything
`bit1`	Format of the file uploaded by the FTP-GPRS module: 0: ini base64 (text file similar to ini file, M-Bus frame are base64 encoded) 1: BIN (binary file)
`others`	*Reserved, do not change this bits*

`si` Storage interval

`27h`	day When the value of the storage interval is 0 [day], the reading is done only once, as soon as possible according to the reading periods of the devices.
`28h`	month When the value of the storage interval is 0 [month], the reading is done only once, but the 646 ignore the reading periods of the devices.

st	Status	**646**	***M-Bus standard***
	bit1..0	Application	*Application*
	00b	No error	*No error*
	01b	†	*Application busy*
	10b	Any application error	*Any application error*
	11b	†	*Reserved*
	bit2	Main power cut or battery low	*Power low*
	bit3	†	*Permanent error*
	bit4	†	*Temporary error*
	bit5	†	*Manufacturer specific*
	bit6	Invalid time clock	*Manufacturer specific*
	bit7	†	*Manufacturer specific*

wp	Device write protect	
	00	write protect disable
	01	write protect enable

† Not used.

3. Frame request “Rsp_3” with “REQ_UD2" (Adr.253):

Frame “Rsp_3” (contains information of the FTP configuration)

					<MbusRecord> XML attributes					
					Name	SubUnit	Tariff	Storage	Function‡	Parent tag
	Field	Frame bytes in hex (Note 1)	Coding	Comment						
Start	Start, **L**ength	68,Le Le,68								
	Control	08		Respond with user data, RSP_UD						
	Address	FD								
User Data	**C**ontrol **I**nformation	72		Variable structure respond						
	Identification number	xx xx xx xx	A, 32 bits		IdentificationNumber					<Header>
	Manufacturer ID	EE 4D	C, 16 bits	"SON"	Manufacturer					
	Version of meter	0C	C, 8 bits	12	Version					
	Device type	0E	D, 8 bits	Bus / System component	DeviceType					
	Access number	xx	C, 8 bits		AccessNumber					
	Status	st	Ds, 8 bits		Status					
	Signature	00 00	C, 16 bits	Not used	Signature					
	K2 FTP Server URL	8D 90 50,FF 29,Ln ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	LVAR, 0..32	§, empty = disabled	UniformResourceLocator	2	5	0	0	<Records>
	K2 FTP Username	8D 90 50,FD 12,Ln ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	LVAR, 0..16	Note 2	AccessCodeUser	2	5	0	0	
	K2 FTP Password	8D 90 50,FD 16,Ln ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	LVAR, 0..16	Note 2	Password	2	5	0	0	
	K2 FTP Directory Pathname	8D 90 50,FF 27,Ln ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	LVAR, 0..16	§	Pathname	2	5	0	0	
	K2 HTTP Time Server URL	8D A0 50,FF 29,Ln ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	LVAR, 0..32	§, empty = disabled	UniformResourceLocator	2	6	0	0	
	More records in next	mo		Start of manufacturer specific data	ManufacturerDataBlock					
End	**C**heck **S**um	cs								
	Stop	16								

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=dur

§ manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailled description in the Keys sheet.
2. The password must be entered before to read this value, otherwise it is missing from the RSP_UD.

4. To read a device contained in the list of the central, send the command “REQ_UD2" (Adr.253):

Frame “Rsp_4” or “Rsp_xx” according to the number of radio devices memorized in the central.

					<MbusRecord> XML attributes					
	Field	Frame bytes in hex (Note 1)	Coding	Comment	Name	SubUnit	Tariff	Storage	Function‡	Parent tag
Start	Start, Length	68,Le Le,68								
	Control	08		Respond with user data, RSP_UD						
	Address	FD								
User Data	Control Information	72		Variable structure respond						
	Identification number	xx xx xx xx	A, 32 bits		IdentificationNumber					<Header>
	Manufacturer ID	EE 4D	C, 16 bits	"SON"	Manufacturer					
	Version of meter	0C	C, 8 bits	12	Version					
	Device type	0E	D, 8 bits	Bus / System component	DeviceType					
	Access number	xx	C, 8 bits		AccessNumber					
	Status	st	Ds, 8 bits		Status					
	Signature	00 00	C, 16 bits	Not used	Signature					
	Entry of device list	0D,FF 16,Ld xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	LVAR	§ See "Device Entry" sheet	DeviceListEntry	0	0	0	0	<Records>
	Entry of device list	0D,FF 16,Ld xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	LVAR	§ See "Device Entry" sheet	DeviceListEntry	0	0	0	0	
	Entry of device list	0D,FF 16,Ld xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	LVAR	§ See "Device Entry" sheet	DeviceListEntry	0	0	0	0	
	Entry of device list	0D,FF 16,Ld xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	LVAR	§ See "Device Entry" sheet	DeviceListEntry	0	0	0	0	
	More records in next telegram	mo		Start of manufacturer specific data	ManufacturerDataBlock					
End	Check Sum	cs								
	Stop	16								

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=du

§ manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailled description in the Keys sheet.

7.3.2 Reading of read and saved radio device data

When the radio central has done a reading of devices contained in its list, the data of these devices will be saved in the memory of the central.
In order to read the saved data, one must do the following:
Cf. Annexe A, « Process of the reading of read device data saved in the radio central», for the detailed schema of the reading process.

The field “Device Entry” contains the information of the radio device to read:

		Identification Number	Manufacturer ID	Version (Generation)	Device Type (Medium)	Radio Address	Radio Device Type	Options	Maximal Frame Number	Application Reset Subcode	Date of Last Successful Reading	Reserved	Reserved	Radio Repeater Address
	Type	A	C	C	D	A	C	D	C	D	G	C	C	A
	Bytes	4	2	1	1	4	1	1	1	1	2	1	1	6*4
	Notes	a, e	a, e	a	a	b, e	b	b	b	b	c, e			b, d, e
Device type	Values to read													
HCA 502S, 552	All values (compact reading)	xxxxxxxxh	4DEEh	4	08h	xxxxxxxxh	0	80h	01h	01h	0101h	FFh	FFh	xxxxxxxxh
Supercal 539 PLUS	Current values	xxxxxxxxh	4DEEh	4	04h	xxxxxxxxh	1	80h	01h	00h	0101h	FFh	FFh	xxxxxxxxh
	+ monthly energy							80h	02h	00h				
	+ monthly volume							80h	03h	00h				
	All values							80h	05h	00h				
540 pulses	All values	xxxxxxxxh	4DEEh	1	00h	xxxxxxxxh	2	80h	04h	00h	0101h	FFh	FFh	xxxxxxxxh
531	frames 106, 107	xxxxxxxxh	4DEEh	0	04h	xxxxxxxxh	3	80h	04h	02h	0101h	FFh	FFh	xxxxxxxxh
590 WCA	All values	xxxxxxxxh	38AFh	4	07h	xxxxxxxxh	4	81h	01h	00h	0101h	FFh	FFh	xxxxxxxxh
580 Water counter	All values	xxxxxxxxh	4DEEh	10	07h	xxxxxxxxh		80h	01h	00h	0101h	FFh	FFh	xxxxxxxxh
581 Water counter	All values	xxxxxxxxh	4DEEh	20	07h	xxxxxxxxh		80h	01h	00h	0101h	FFh	FFh	xxxxxxxxh
556 HCA	Current values	xxxxxxxxh	4DEEh	16	08h	xxxxxxxxh	5	B1h	01h	00h	0101h	FFh	FFh	xxxxxxxxh
	All values							B1h	02h	00h				
541 Radio interface	All values	xxxxxxxxh	4DEEh	10	00h	xxxxxxxxh	6	90h	03h	00h	0101h	FFh	FFh	xxxxxxxxh
656 Repeater	All values	xxxxxxxxh	4DEEh	30	0Eh	xxxxxxxxh		00h	01h	00h	0101h	FFh	FFh	xxxxxxxxh

Notes

a	This value is part of the M-Bus secondary address used to access the data of a device stored in 646. It is updated by 646 according to the value really read from the device by radio.
b	This value is used to access the device by radio. It is never modified by the 646 itself.
c	The date 1.1.2000 means "not yet successful read", coded in M-Bus G type: 0101h
d	This field is optional. It contains the addresses of up to 6 radio repeaters. The unused repeater addresses must be set to zero.
e	Multibytes values are transmitted with LSB first.

Fill in the frame « Selection of Slaves » SND_UD (master to slave)

					<MbusRecord> XML attributes					
	Field	Frame bytes in hex (Note 1)	Coding	Comment	Name	SubUnit	Tariff	Storage	Function‡	Parent tag
Start	Start, Length	68,Le Le,68								
	Control	73|53		Send user data to slave, SND_UD						
	Address	FD								
User Data	Control Information	52		Selection of slaves						
	Identification number	xx xx xx xx	A, 32 bits		IdentificationNumber					
	Manufacturer ID	xx xx	C, 16 bits		Manufacturer					
	Version of meter	xx	C, 8 bits		Version					
	Device type	xx	D, 8 bits		DeviceType					
End	Check Sum	cs								
	Stop	16								

The values contained in the fields « Identification number, Manufacturer ID, Version et Device type » of the block Rsp_xx (Device Type) must be transferred to the respective field of the block « Selection of Slaves »

7.4 Writing concept in the radio central

Cf. Annex B, for the detailed schema of the writing process.
Cf. chapter Password to define the position of the field « Password » in the block.

7.4.1 Configuration modification of the radio central

Fill in the frame « Structured write » SND_UD (master to slave)

					<MbusRecord> XML attributes					
	Field	Frame bytes in hex (Note 1)	Coding	Comment	Name	SubUnit	Tariff	Storage	Function‡	Parent tag
Start	Start, Length	68,Le Le,68								
	Control	73|53		Send user data to slave, SND_UD						
	Address	FD								
User Data	Control Information	51		Stuctured write telegram						
	Enter password	0C,FD 16,xx xx xx xx	A, 32 bits			0	0	0	0	
	Set new password	4C,FD 16,xx xx xx xx	A, 32 bits	Note 2		0	0	1	0	
	Current date & time	04,6D,xx xx xx xx	F, 32 bits	Notes 2 and 3	DateAndTime	0	0	0	0	
	Identification number	0C,79,xx xx xx xx	A, 32 bits	Note 2	IdentificationNumber	0	0	0	0	
	K2 module GSM PIN code	8D 80 40,FF 18,Lp ch ch ch	LVAR	§ empty = disabled, Notes 2 and 7	PinCode	2	0	0	0	
	K2 module call back number	8D 80 40,FF 1E,Ln ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch ch	LVAR	§ empty = disabled, Note 2	PhoneNumber	2	0	0	0	
	Add entry to device list	0D,FF 16,Ld xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx	LVAR	§ Notes 2, 4 and 6	DeviceListEntry	0	0	0	0	
	Clear device list	0D,FF 17,08 FF FF FF FF FF FF FF FF	LVAR	Notes 2 and 5		0	0	0	0	
	Reset battery use duration	03,FD 6C,00 00 00	B, 24 bits	Note 10	OperatingTimeBattery	0	0	0	0	
	Parameter flags (Bits set)	01,FD E6 03,pp	D, 8 bits	Mentioned bits are setted. Note 8	StateOfParameterActivation	0	0	0	0	
	Parameter flags (Bits clear)	01,FD E6 06,pp	D, 8 bits	Mentioned bits are cleared. Note 9	StateOfParameterActivation	0	0	0	0	
End	Check Sum	cs								
	Stop	16								

Symbols

‡ Function: 0=instantaneous, 1=maximum, 2=minimum, 3=during error s

§ manufacturer specific VIFE

Notes

1. For non hexadecimal or lower case digits see the detailled description in the Keys sheet
2. The password must be entered before to change this value.
3. Use the standard time all the year regardless of the daylight-saving time (as the radio devices).
4. The 646 needs at least 50 ms per device to add them to the list, don't send frame during this period.
5. The 646 needs at least 7.5 s to do this operation, don't send frame during this period.
6. At the end of the current link, the 646 needs up to 3 minutes to update its internal data and it is unavailable.
7. At the end of the current link, the 646 needs about 6 s to reinitialize the modem and it is unavailable.
8. For example, to set the bit0 the value is 01h, to set both bit1 and bit3 the value is 0Ah.
9. For example, to clear the bit0 the value is 01h, to clear both bit1 and bit3 the value is 0Ah.
10. Other values than 0 are not allowed. The "Radio reading counter" is also reset

All the fields of the frame Rsp_2 which contain information about the configuration of the radio central can be modified and inserted in the block « Structure write ».

7.4.1 Password of the radio central

To modify the configuration of the radio central, it is necessary to fill in the field « password » of the frame « Structured write » SND_UD (master to slave).

The field « password » must always be in the first position in the block, or else it will not be possible to modify the configuration of the radio central.

The radio central is shipped with the following: ***00001234***
This password can be modified according to one's own needs.

7.4.2 Adding a device to the device list in the central

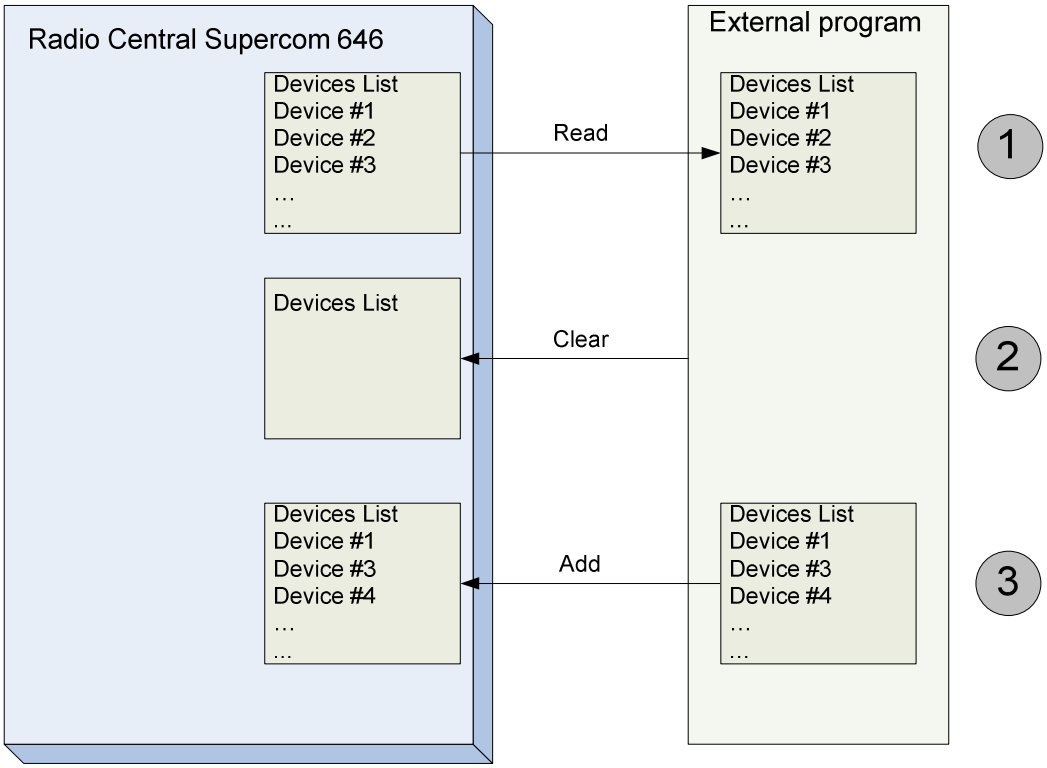
Fill in the frame « Structured write » SND_UD with the information relative to the device to be added to the list.
See the field « Device Entry » for the information to add according to the type of device.

Note : The password must always be present in the blocks and must be in the first position in the block.

7.4.3 Device list modification

To modify the device list contained in the radio central, one must proceed as follows:
1. Read the existing list in the central and copy it in external software. Modify the device list.
2. Erase the list of the radio central.
3. Add the modified device list to the central.

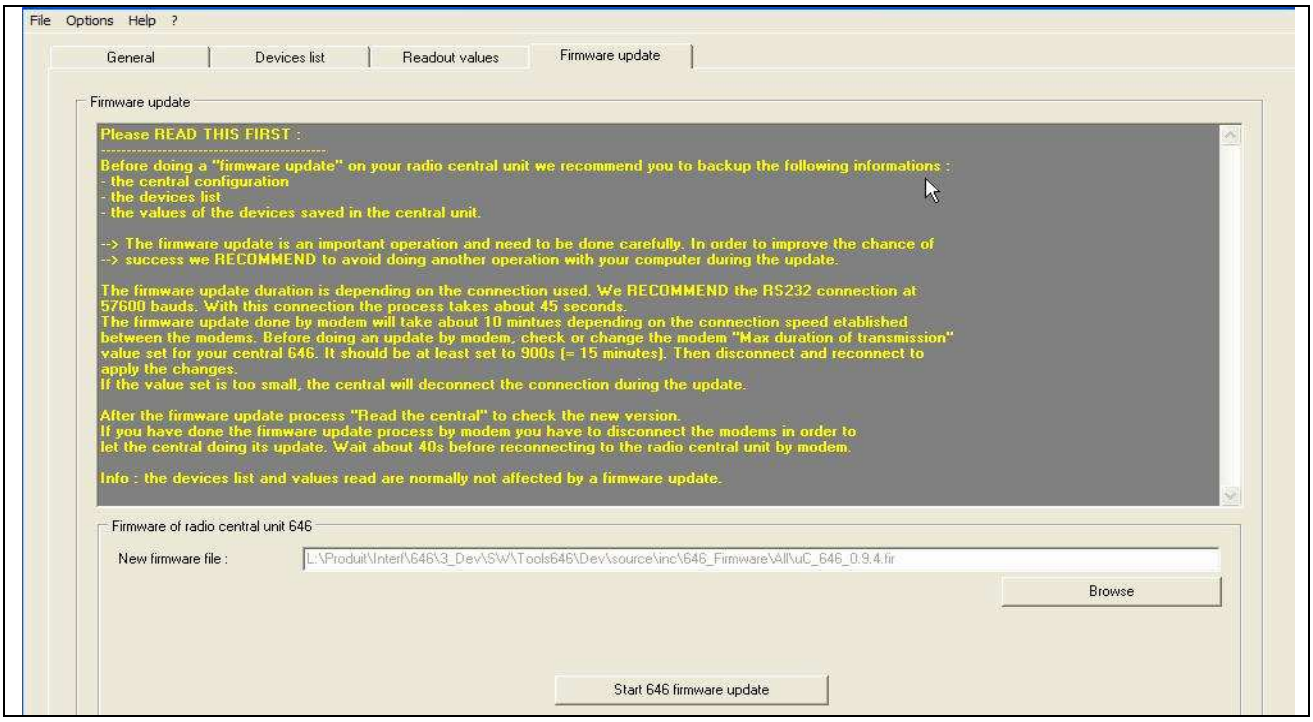
All these operations can be done with the help of the Tools646 software supplied by Sontex or by external software using M-Bus commands.



8. Uses

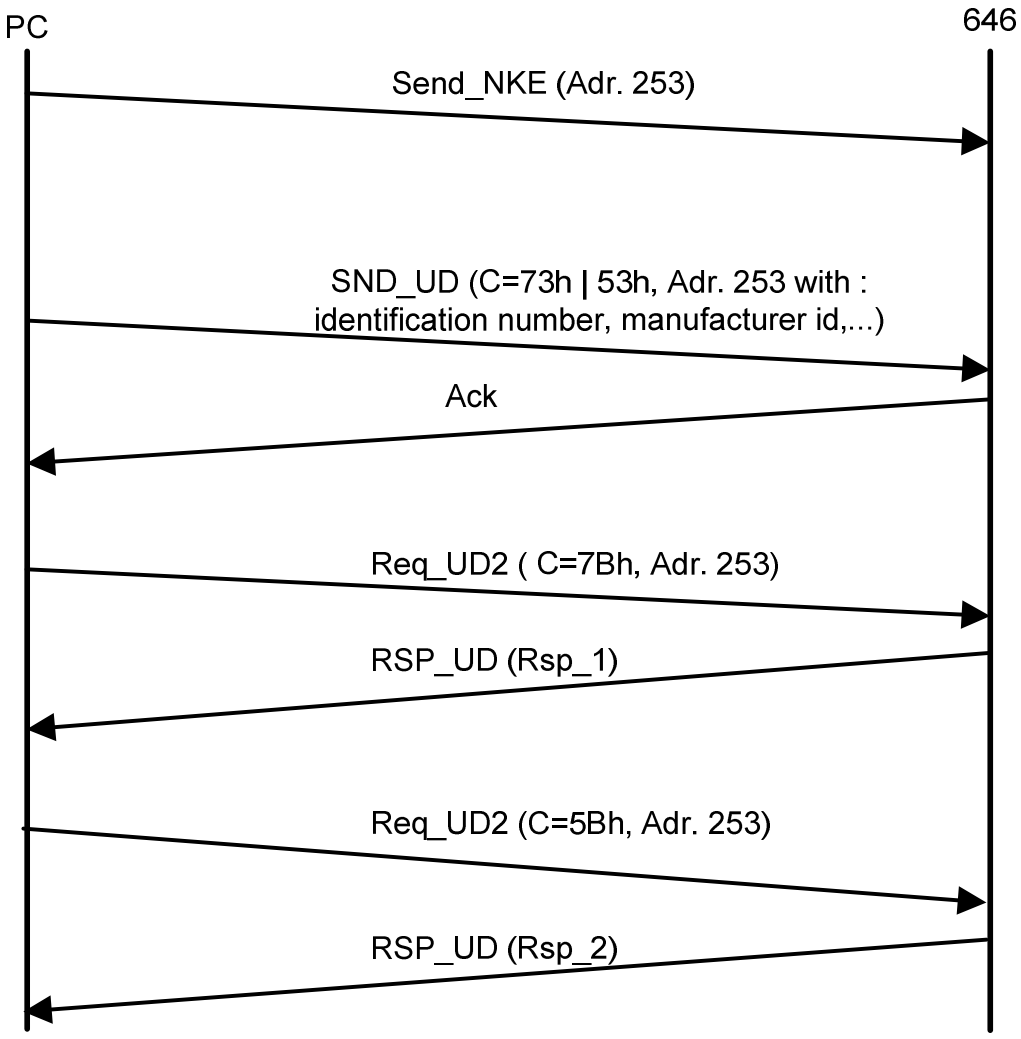
8.1 Firmware updating

The Supercom 646 Radio Central firmware can be updated with the Toosl646 software from a computer via the communication interface of the central.

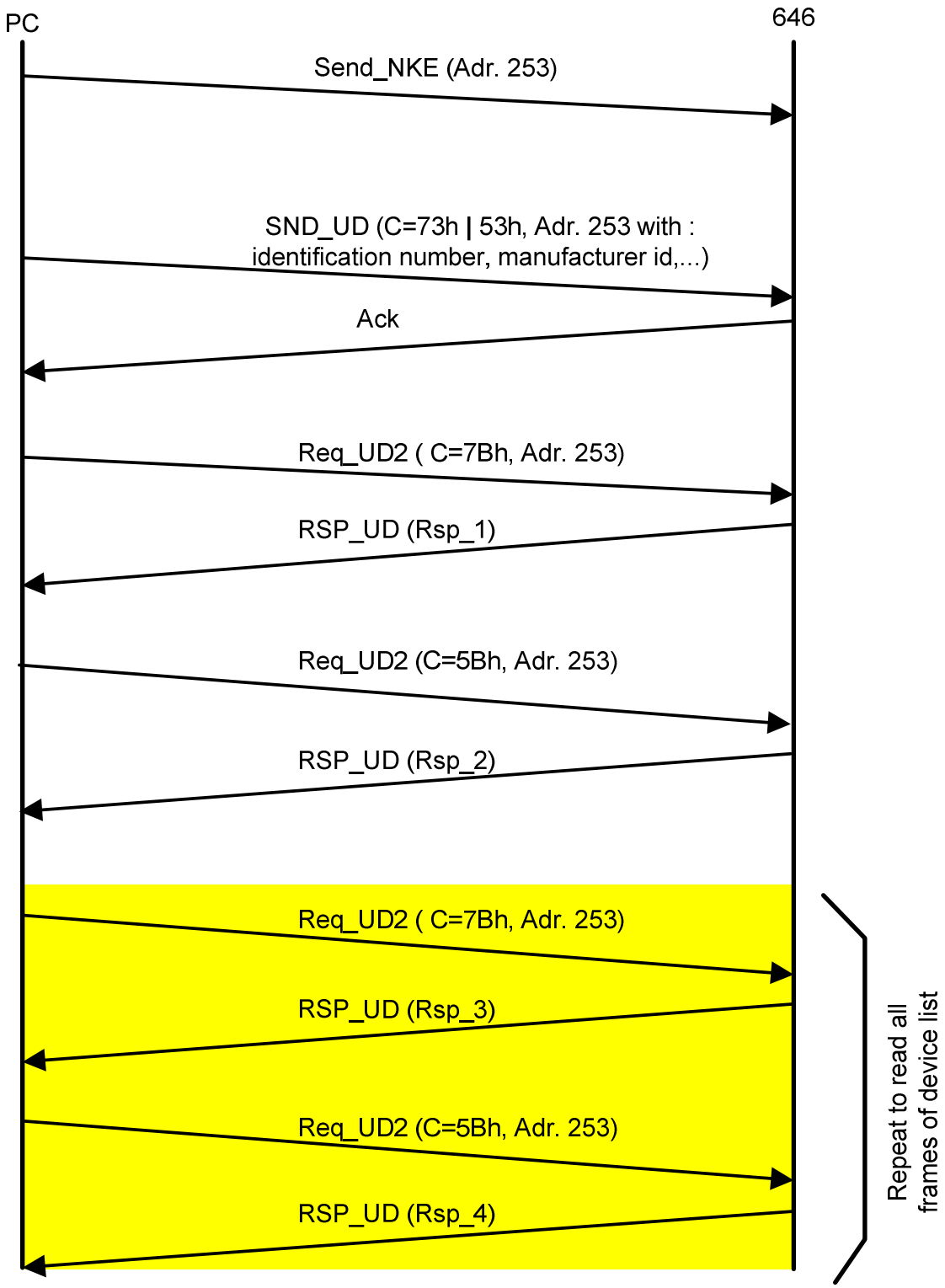


9. Annexe A

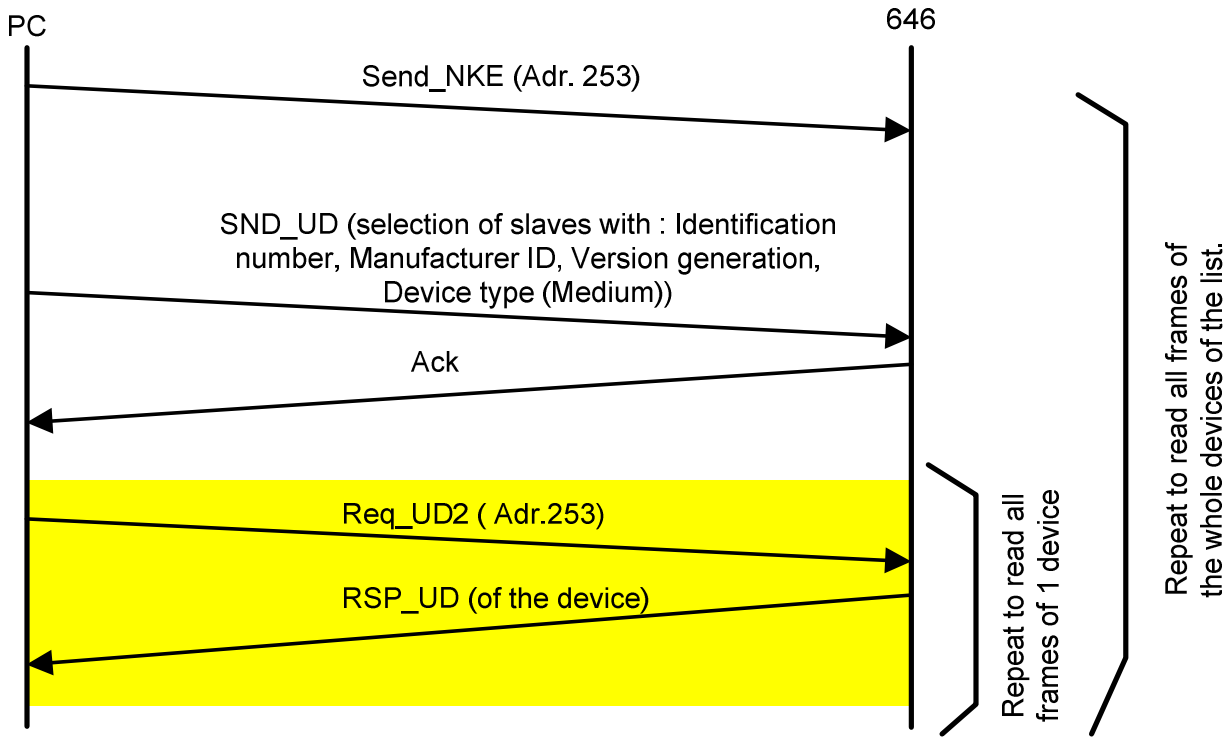
9.1 Reading process of the radio central configuration



9.2 Reading process of the radio central saved device list



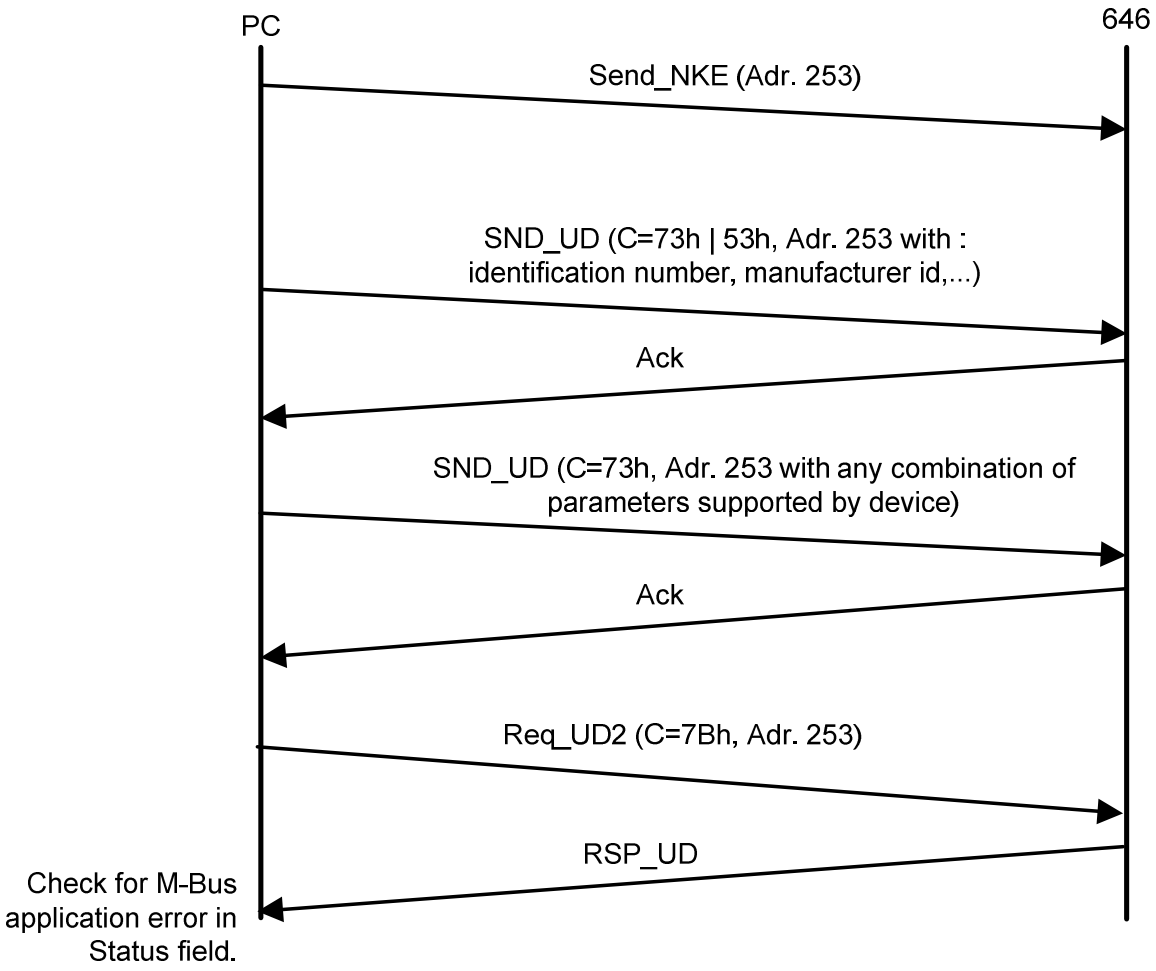
9.3 Reading process of the radio central's read and saved device data



The frame RSP_UP contains the read data of the selected radio device. This frame RSP_UD is specific to each Sontex radio device. The description of these M-Bus frames can be supplied by Sontex.

10. Annexe B

10.1 Writing or configuration process of the radio central

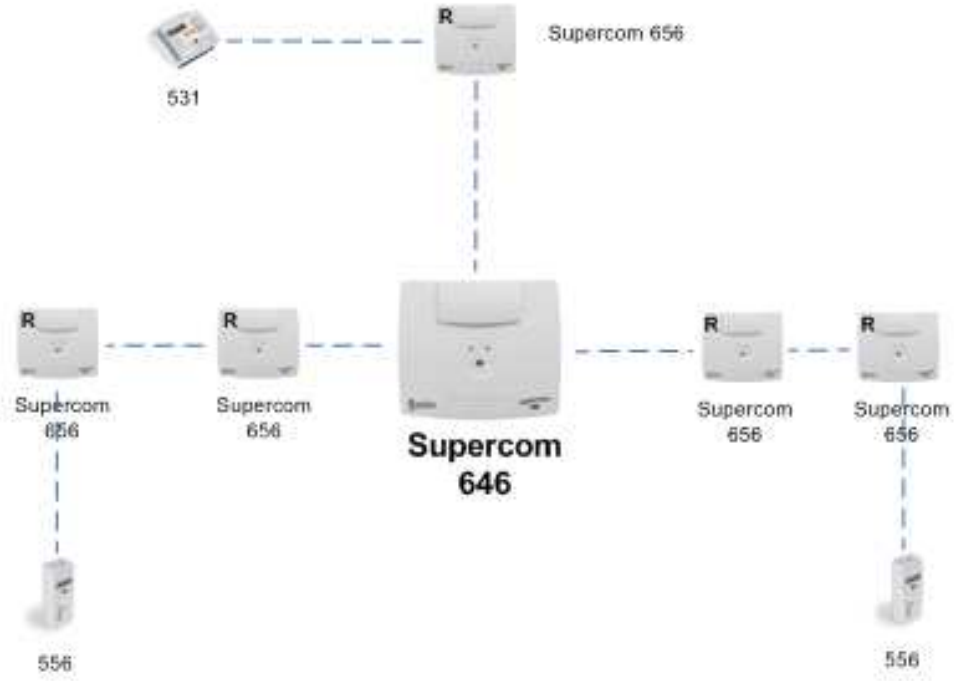


11. Annexe C

11.1 Radio repeater Supercom 656 R

To expand the operation range of the radio central Supercom 646 radio repeaters can be installed between the radio central and the measuring devices equipped with a radio interface.
These repeaters allow reading the radio devices where the radio signal of the radio central Supercom 646 doesn't reach.
Every repeater can relay up to 500 radio devices while the radio central can read up to 1000 radio devices. Every repeater is considered as one radio device.

Up to 6 repeaters can be cascaded one after the other in the same chain. Several chains in different directions are possible. The functionality is supported up to 6 chains.



Sample with a radio central Supercom 646 GPRS and repeaters Supercom 656 R

The following Sontex products can be read through the repeater 656 R:
- Heat Cost Allocator 502s / 552 / 556
- Water Cost Allocator 590
- Compact heat meter Supercal 539
- Integrator Supercal 531 Integrator
- Radio pulse adapter 540 (2 entries max.) / Supercom 541
- Radio module Supercom 580 / 581

For more information about radio repeater Supercom 656 R, please refer to the user guide Tools646 and the manual Supercom 656 R.

12. Annexe D

12.1 Parameterization

12.1.1 PIN code

The PIN code is a “password” which enables services defined on the SIM card to be used. The mobile telephone service provider supplies a PIN code for each SIM card.
The PIN code must be parameterized in the central unit using Tools646 in a **direct connection** (optical interface, RS232 or USB). Remote parameterization of the PIN code is not possible.

12.1.2 Call back number

If the CSD MT service is not supplied by the mobile telephone subscription, a call back number must be parameterized.
The call back number is the telephone number assigned to the modem which is used by Tools646.
The call back number must be parameterized in the central unit using Tools646 in **direct connection** (optical interface, RS232 or USB). Remote parameterization of the call back number is not possible.

12.1.3 Password for SMS controls

A password can be defined to receive SMS messages. All SMS which do not begin with the password will simply be disregarded.
This gives protection against undesired SMS and avoids the need to send a reply.
The SMS password must be parameterized in the central unit using Tools646.

12.1.4 GPRS access

The FTP-GPRS module needs some information to connect up to the GPRS network.
The mobile telephone service provider must supply the following information:

Example:

Access Point Name	gprs.swisscom.ch
Username	gprs
Password	gprs
DNS	164.128.036.034

This information must be parameterized in the central unit using Tools646.

12.1.5 FTP access

The FTP-GPRS module needs certain information to connect up to the FTP server.
The internet host must provide the following information:

Example:

URL of the FTP server	files.sontex.ch
Username	central646
Password	secret

You are strongly advised to create a file for each 646 central unit on the FTP server. This enables the quantity of data downloaded to be reduced and with it the cost: Fr example, when the FTP-GPRS module searches for an update request file on the FTP server.
The file name is free. By default ex-works the file name corresponds to the manufacturing serial number of the 646 central unit.
The information for access to the FTP server and the file name must be parameterized in the central unit using Tools646.

12.1.6 HTTP Time Server access

The FTP-GPRS module needs the URL address of an HTTP time server to adjust the central unit clock. Normally all HTTP servers can supply the time with a degree of accuracy close to one second. But you are strongly advised to choose a trustworthy site with the agreement of the site proprietor and to ask the site host to specify the precision and reliability of the HTP time server.
It is preferable to choose a geographically close HTTP server (located in the same country or on the same continent).
The HTTP server gives UTC time. To convert this into local time, the 646 central unit needs to know the time zone which corresponds to winter time. For Europe:

UTC+0	Ireland, Portugal, United Kingdom
UTC+1	Germany, Austria, Belgium, Spain, France, Hungary, Italy, Luxembourg, Netherlands, Poland, Czech Republic, Slovakia, Sweden, Switzerland

The URL of the HTTP and the time zone (winter time) must be parameterized in the central unit using Tools646.

12.2 SMS

12.2.1 General syntax

12.2.1.1 Content of a command SMS sent to the central unit

Syntax:
[password]command[?] param1, param2, …

Details:

[ ] :	optional element
password:	if the SMS password is defined in the central unit, it must be specified when a command is sent.
command:	name of the command (in either upper case or lower case)
command?:	name of the command followed by a question mark, request for a specific reply; some commands do not automatically send a reply.
param1:	parameter

The password is case-sensitive (upper case/lower case).
The command is not case-sensitive. For example, you may use "TEST", "test" or "Test".
The password and the command name must be separated by at least one space.
When the question mark is used, it must immediately follow the command name without a space.
The command name (with or without?) and the first parameter must be separated by at least one space.
The parameters are separated by commas. The parameters of some commands can be optional.

12.2.1.2 Content of a reply SMS sent by the central unit

Syntax:
num_id command result 1, result 2, …

Details:

num_id :	central unit identification number
command:	the name of the command at the origin of the reply in upper case and without the final '?'

The results are separated by commas.
The results sent back depend on the command.

12.2.1.3 Processing of command SMS messages by the central unit

If a password is incorrect, the SMS will be disregarded and no reply sent back.
If the command is not recognised, an error message will be sent back to the originator in the form:
num_id ERROR command UNSUPPORTED

If some parameters are not correct for the requested command, or if a fatal error occurred during execution of the command, an error message is sent back to the originator in the form:
num_id ERROR command message

12.2.2 Commands

12.2.2.1 TEST

This command enables the working of the SMS, the GPRS module and the central unit in general to be verified.
The answer which is sent back contains information on the current status of the GPRS module and of the central unit.

Syntax of the command sent to the central unit:
[password] TEST[?] [label]

Details:
label: free identifier (letters and numerals, no comma)

The reply is implicit. There is no need to add the question mark (TEST?).

Syntax of the reply sent by the central unit:
num_id TEST label, signal_quality, time, app_java, IMEI, version_fw, status, num_app, attempt

Details:
label: identifier received, unchanged
signal_quality: quality of the GSM signal in dBm or '?' if unknown or impossible to detect
time: present date and time of the module in the format 'yyyy-mm-dd hh:mm'
app_java: name and release of the Java application
IMEI: unique number of the GSM modem
version_fw: release of the 646 central unit firmware
status: M-Bus status of the 646 central unit in hexadecimal format
num_app: number of appliances for which data are available and total number of appliances
attempt: remaining number of attempts to read the radio

Example
SMS sent: 1234 TEST
SMS received: 12345678 TEST, -91 dBm, 2010-08-16 12:17, FtpGprs 0.9.2, IMEI:353234023772047, Fw:1.0.56, Stat:00h, 237/237, RemAtt:0

12.2.2.2 **FTPEXCH**

This command forces the central unit to effect an exchange with the FTP server. In addition it enables:
a listing file for which remote submission by FTP has failed to be recovered;
the central unit to be forced to download the request.ini file stored on the FTP server.

Syntax of the command sent to the central unit:
[password] FTPEXCH[?]

By default the central unit does not send an answer. The question mark must be specified to receive an answer.
Syntax of the answer sent by the central unit:
num_id FTPEXCH result

Details:
result: OK if FTP exchange has taken place normally or ERROR if FTP error

Example:
SMS sent: 1234 FTPEXCH?
SMS received: 12345678 FTPEXCH ok

12.2.2.3 **UPLOAD**

This command forces the central unit to create a list file with the data in its possession after which the file is remote-transferred by inducing an exchange with the FTP server.

Syntax of the control sent to the central unit:
[password] UPLOAD[?]

By default the central unit does not send a reply. The question mark must be specified to receive a reply.

Syntax of the reply sent by the central unit:
num_id UPLOAD result

Details:
result: ok if FTP exchange has proceeded normally or ERROR in the event of an FTP error

Example:
SMS sent: 1234 UPLOAD?
SMS received: 12345678 UPLOAD ok

12.2.2.4 **READ**

This command enables an immediate radio reading to be initiated.

Syntax of the command sent to the central unit:
[password] READ[?] options

Details:
options: [CLEAR|ALL] [NOW] [UPLOAD]
The options are not case-sensitive (upper case/lower case); they may be specified in any desired order and they must be separated by at least one space (no comma!)

CLEAR:	Clear data from devices before radio reading.
ALL:	Radio reading of all devices. By default only those devices which have no data are read.
NOW:	Disregards the device radio listening periods. By default the radio times are respected.
UPLOAD:	At the end of the radio reading, a record file is created and remote-transferred to the FTP server.

To initiate the radio reading, the GPRS module programs reading date No. 5 (Reading date 5, Reading period 5, Reading options 5). Use of the READ command causes reading date 5 to be erased.
By default, the central unit does not send a reply. The question mark must be specified to receive a reply.
The reply is sent after programming reading date 5. Reception of the reply does not mean that radio reading has been completed.

Syntax of the reply sent by the central unit:
num_id READ result

Details:
result: OK if reading date 5 was correctly programmed. ERROR if there is a programming error.

Example:
SMS sent: 1234 READ? CLEAR NOW UPLOAD
SMS received: 12345678 READ ok

12.2.2.5 **CALLBACK**

This command enables the telephone number used by the central unit for the call back function to be modified.

Syntax of the command sent to the central unit:
[password] CALLBACK[?] number

Details:
number: the new call back number

If the call back number is not specified, the call back function of the central unit is deactivated.
By default the central unit does not send back a reply. To receive a reply, the question mark must be specified.

Syntax of the reply sent by the central unit:
num_id CALLBACK result

Details:
result: OK if the call back number was correctly programmed. ERROR if programming error.

Example:
SMS sent: 1234 CALLBACK? 0796878262
SMS received: 12345678 CALLBACK ok

13. Annexe E

13.1 BIN file Format

Periodically, the FTP-GPRS module read the data stored in the central 646 and create a BIN file that is uploaded to the FTP server. This BIN file contains the data of all devices read by radio.

File name: <IMEI>_<FileTime>.BIN

For example: 355632003678233_1236585660786.BIN

The IMEI is a 15 digits number that represents the International Mobile Equipment Identifier of the FTP-GPRS module.

The FileTime is the local time of the file creation (in milliseconds from midnight, January 1, 1970)

For further details on IMEI and FileTime see in the table below.

The BIN file is a binary file composed of :

- a fixed header of 16 bytes
- a variable length DeviceData structure repeated for each device
- a fixed trailer of 7 bytes

The following table describes the internal data structure of a BIN file:

Sect	Field Name	Size [byte]	First byte	Range	Description
Header	IMEI	8	MSB	$0..10^{15}-1$	International Mobile Equipment Identifier. This number is unique for each FTP-GPRS module.
	FileTime	8	MSB	$0..10^{13}-1$	Local time of the file creation. Number of milliseconds from midnight, January 1, 1970 (1970-01-01T00:00).
DeviceData	PrimaryAddr	2	MSB	0..255	M-Bus primary address. Always 0 for the central 646, the radio devices don't have a primary address.
	IdNumber	4	MSB	0..99'999'999	M-Bus identification number.
	TelegramType	2	MSB	0..2	Type of the telegrams. Always 1 (M-Bus) for the central 646.
	TelegramsLength	2	MSB	0..32'767	Length (in bytes) of the following TelegramsData
	TelegramsData	Telegrams Length	-		Concatenated telegrams of the device.
Trailer	DeviceListCount	2	MSB	0..32'767	Number of devices in the list.
	DeviceReadCount	2	MSB	0..32'767	Number of read devices.
	Error	1	-	0; 1	0: No error (DeviceReadCount = DeviceListCount); 1: some devices are not read (DeviceReadCount < DeviceListCount)
	CRC	2	LSB		CRC16 of this file content according to RFC1662.

MSB: Most Significant Byte

LSB: Least Significant Byte

Notes

Notes

CD

CE R&TTE 1999/5/CE conformity
The detailed conformity certificate is available on the Sontex site:
www.sontex.ch

Technical Support
For technical support, contact the local Sontex agent or Sontex SA directly.

Hotline Sontex:
sontex@sontex.ch
+41 32 488 30 04

 0646P201