Mobitex-1200 Packet System

Advanced Protocols

WAVECOM
NACHRICHTENTECHNIK

MOBITEX-1200 Overview

Mobitex was originally implemented in 1986 for Televerket Radio, the radio department of the Swedish telecommunication administration, later Telia and now Teliasonera. The development and production of equipment was undertaken by Ericsson. Today the system is owned and operated by Multicom Security AB, a private company partly owned by Teliasonera and Ericsson.
The system covers most of Sweden (see Fig. 1), and a similar system in the 160 MHz range was formerly in operation in Finland for Sonera, but it is unknown whether it is still operational. Mobitex has been under constant development and the latest version operates at 8000 bps. In this document the term “Mobitex-1200” is used for the older system, which operates at 1200 bps, and in several ways deviates from the more recent 8000 bps version. One difference is, there is no scrambling in the Mobitex-1200 protocol whereas Mobitex-8000 has bit scrambling.

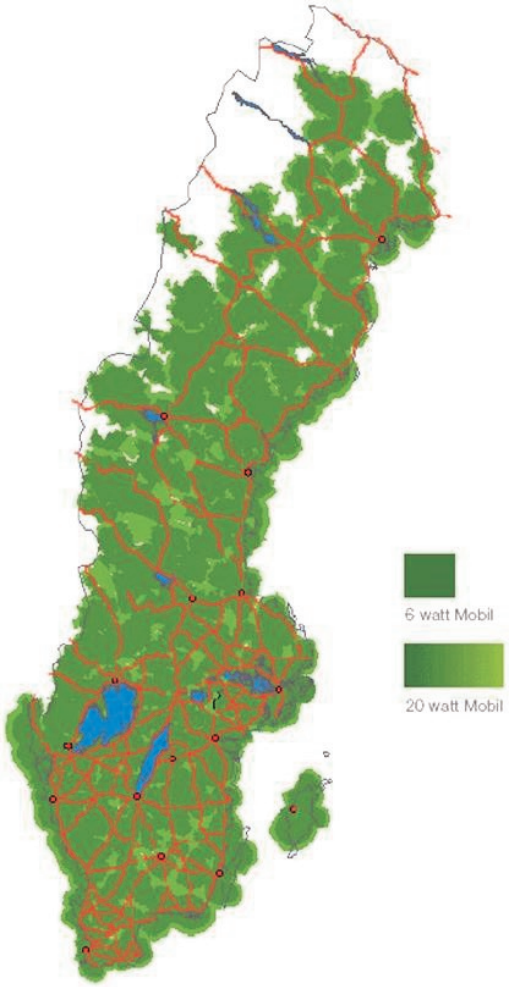


Fig. 1 Mobitex-1200 covers nearly 90% of Sweden and all inhabited areas

Mobitex Architecture

Mobitex is hierarchically organized with a main exchange (MHX1) through which all national traffic is switched. Six regional MHX2 exchanges connect to the MHX1 and are in turn connected to approx. 25 MOX area exchanges. The MHX2 switches interregional traffic. Fixed terminals (FST, 2400-9600 bps) and external gateways for exchange of traffic with the Internet, PSTN, GSM/SMS etc. are connected to the MOXs as are the approx. 250 base stations (BAS). At the lowest level of the hierarchy radio modems (MOB) connect to the base stations. Traffic between mobiles connected to the same BAS will be switched there, the principle being to switch at the lowest possible level. By using this architecture, unnecessary traffic load is removed from the trunks, and a high degree of autonomy and resilience is ensured even if the higher level links are not operational. A Network Control Centre (NCC) in Gothenburg handles system monitoring, logging, subscriber handling and accounting. Switches are connected through X.25 links (see fig. 2).
Mobitex is enabled for data, voice and alarm messages.

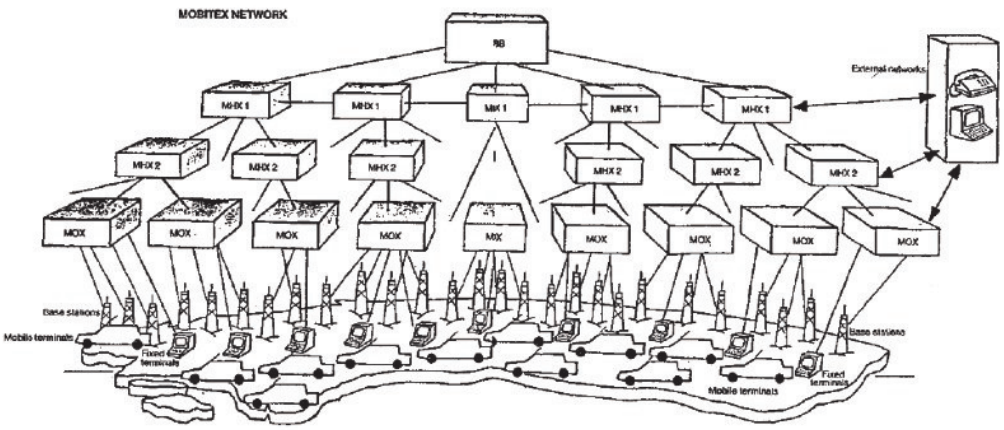


Fig. 2 Mobitex Network architecture

Mobitex Protocol stack

In Fig. 3 the Mobitex protocol stack is depicted. Software in the mobile terminal formats text or data into Mobitex PAcKets (MPAK), which in turn are carried in MASC (Mobitex ASynchronous Communication protocol) packets. The MASC packets are forwarded over a RS-232 link to the radio modem. In the modem MPAKs are formatted into ROSI (Radio Open System Interface) data blocks, which eventually are fed to a FFSK modulator (Mobitex 8000 employs a GMSK modulator). In the base station the inverse process takes place except for the landline protocol which is X.25 or using a gateway TCP/IP.

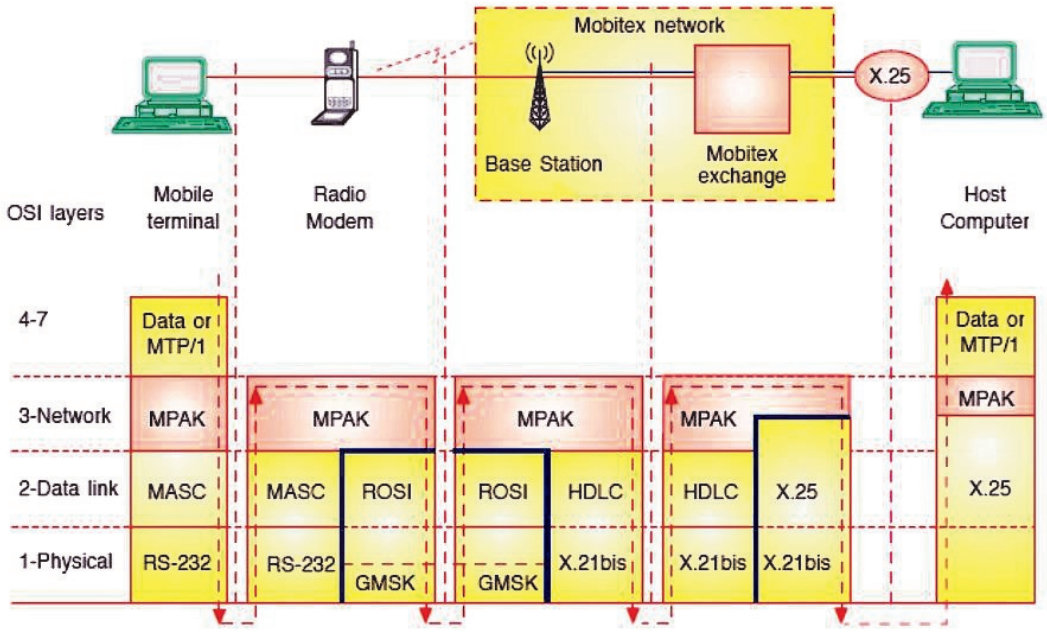


Fig. 3 Mobitex Protocol stack

In Sweden Mobitex 1200 operates in the 80 MHz frequency range (76 - 77 MHz base->mobile and 81 - 82 MHz mobile->base) using FM, modulated with a 1500 Hz FFSK sub carrier having a shift of 600 Hz.
A frame consists of a frame head containing a control and base station information followed by zero or one or more data blocks. Each block contains 69 bits of which 48 bits (6 bytes) are payload data, the remaining 21 bits being parity check bits of an error detecting code.

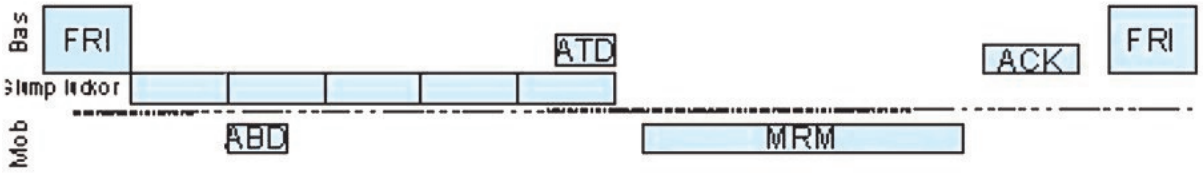
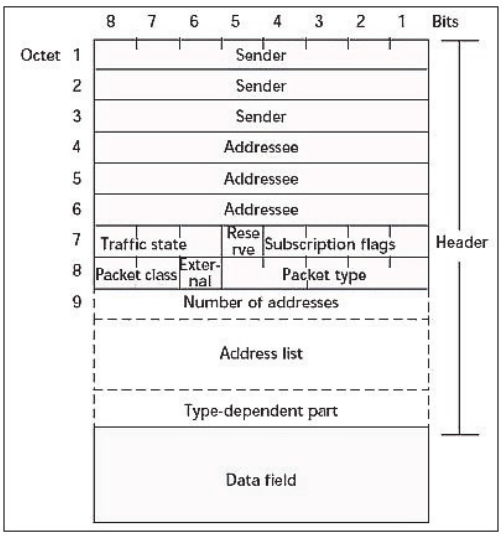


Fig. 4 Mobitex Packet transfer

Mobitex Air Protocol

A frame always contains a primary block and may contain up to 94 additional data blocks called "following" blocks.
The primary block contains addressing and control information. Data blocks can be either data link layer management and control blocks or user data contained in MRM blocks which may contain up to 560 Bytes. If the message is bigger than 560 Bytes, the message must be distributed over more packets and sequences.
Mobitex data link signaling uses slotted Aloha with dynamic frame length control as an access method. Stations wishing to communicate must request permission from the network if they need to transmit packets longer than one slot or if voice communication is desired. Stations normally listen to a nationwide system channel (76.7375/81.7375 MHz). The network may use the system channel as a traffic channel or local access and system channels may be dynamically configured to offload traffic. Local channel availability is signaled in SVP2 link frames.

A mobile station listens for the FRI link frame from the BAS (see fig. 3). The FRI contains information on the slot length and the number of available free slots during the following free period. A mobile with data to transmit picks a random free slot and starts to transmit at the beginning of that slot. If the mobile data is longer than one slot, the mobile station must request more slots using an ABD link frame. The base station will issue a silence signal to prevent other stations from transmitting at the same time.
Adjacent base stations access the nationwide system channel using a TDMA (time division multiplex access) scheme to prevent interference.
Mask addressing is used to distribute traffic over additional channels in areas of heavy traffic.
Data is protected by an error detecting and correcting, shortened linear block code in conjunction with selective ARQ. If one or more blocks are received in error, the receiver asks for a repetition of the block or blocks in error.



At the network layer Mobitex has four packet classes: Packet subscriber communication (PSUBCOM), network layer signaling (DTESERV), circuit switched subscriber communication (CSUBCOM) and packet switched alert communication (PSOSCOM).
PSUBCOM transfers four types of packets: 7-bit printable ASCII, 8-bit transparent ASCII, one byte user defined status messages and higher protocol data. DTESERV is used for signaling at the network layer. PSOSCOM transfers alerts and alert information messages containing dynamic and static information on an alert.
CSUBCOM transfers packets used for the control of circuit switched communication, e.g. setting up and tearing down voice calls.

Fig. 5 MRM structure

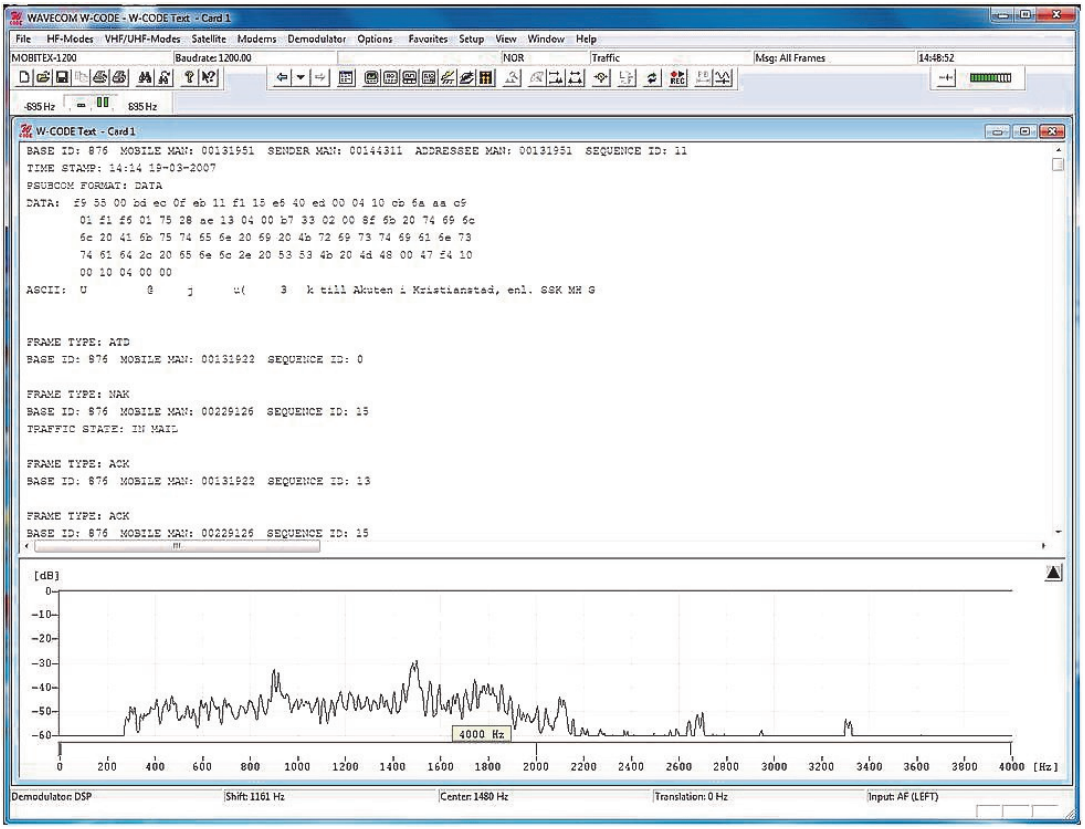


Fig. 6 W-CODE screen shot

Since more than thirty years Wavecom Elektronik AG has developed, manufactured and distributed high quality devices and software for the decoding and retrieval of information from wireless data communication in all frequency bands. The nature of the data communication may be arbitrary, but commonly contains text, images and voice. The company is internationally established within this industry and maintains a longstanding, world-wide network of distributors and business partners.

Product Information

Products	http://www.wavecom.ch/product-summary.php
Datasheets	http://www.wavecom.ch/brochures.php
Specifications	http://www.wavecom.ch/product-specifications.php
Documentation	http://www.wavecom.ch/manuals.php
Online help	http://www.wavecom.ch/content/ext/DecoderOnlineHelp/default.htm
Software warranty	One year free releases and bug fixes, update by DVD
Hardware warranty	Two years hardware warranty
Prices	http://www.wavecom.ch/contact-us.php

System Requirements

	Minimum	*Recommended*
CPU	Core i5 or Core i7 2.8 GHz	Core i7-6700 3.4 GHz
Memory	4 - 8 GB RAM	16 - 32 GB RAM
OS	Windows 7	Windows 10 32-bit or 64-bit

Distributors and Regional Contacts

You will find a list of distributors and regional contacts at http://www.wavecom.ch/distributors.php

WAVECOM ELEKTRONIK AG
8090 Zurich, Switzerland
E-Mail: sales@wavecom.ch
Internet: www.wavecom.ch