ISDN-GSM Interface
AS54x

-User manual AS54x-

AS541/2V
AS541/4V

Configuration software free downloadable from:
WWW.MCS-NL.COM/DOWNLOADS.HTM

- Operation Manual -

Thank you for using a GSM interface with your telecommunication system. This digital cellular telephone interface is designed for use in the GSM (Global System for Mobile communications) network. GSM is the international standard for cellular communication, available in most European countries and many other parts of the world. This product is in conformance with the CE approvals for GSM applications of the European Community.

The AS 54x operates with radio signals which might be subject to interference. It is recommended to use the interface with the external antenna positioned outside of the building.

Please, read the manual!

Remarks before installation

Before installing the AS54X, it is advised to check carefully the contents of the package. The following is included in the package:

AS54X/2V	**AS54X/4V**
AS54X GSM-ISDN Interface with 2 Voice modules	AS54X GSM-ISDN Interface with 4 Voice modules
1 x ISDN connection cables (ca 1,5m length)	2 x ISDN connection cables (ca 1,5m length)
1 x power supply cable	1 x power supply cable
1 x 3dB GSM dual band antenna with 5 m. cable length and fixation mount	1 x 3dB GSM dual band antenna with 5 m. cable length and fixation mount

(optional, other type of antennas and antenna cables can be supplied, depending on the location and GSM-network field strength).

The SIM-cards must be ordered seperately through the GSM-network operator or service provider.

It is advised to make changes in the PABX in order to make it communicate with the AS54X, only through professional and well-trained personnel.

Summary

Inserting GSM-SIM cards

Before inserting the SIM-cards into the AS54X, the following should be verified / installed:

- do you have the correct PIN-number from the SIM-card?

Without PIN, the AS54X can not be installed. Make sure that the PIN is activated.

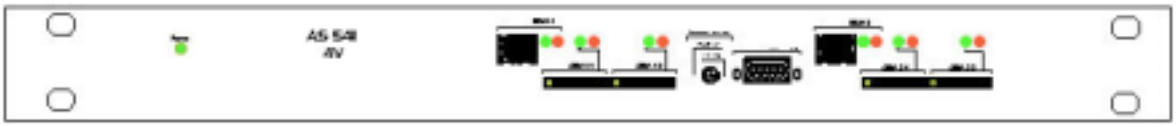
- is the SIM-card working. Is it possible to send SMS-messages etc? Please check this with your network-operator or make a test yourself with a normal GSM-telephone
- Please check that call divertions and 'second calls' are not installed.

All actions can be verified with a normal GSM-telephone. The AS54X can only be used with small SIM-cards with 3V technology.

Inserting the SIM-card
Push the yellow button next to the SIM-card holder. The SIM-card holder will come outside. You can now insert the SIM-card into the SIM-card holder, with the contacts of the SIM pointing below. Please check carefully if the SIM is well inserted into the SIM-card holder.
Now you can enter the SIM-card holder back into the AS54X. This needs to be done with utmost care. Do not push anything!!
Important: the SIM-card ist pointing below in order that the golden contacts are not visible.

Installation

The AS54X has the following connection possibilities and LED's:
Front side AS541:



Power led:	Power connection control (only for AS541)
S0-connection:	2x RJ45 connection. Connection to S0 from PABX Connection to internal or external S0 Point-to-Point or Point-to-Multipoint connection
9Pol SUB D connector: (Local access)	COM-port (RS232) for programming AS54X with PC. The configuration software is web downloadable, **www.mcs-nl.com/downloads**
SIM-card holders:	for mini SIM-cards
Button: (for remote access)	push button to right for enabling remote access or to left for disabling remote access

Back side:

AS541: BNC connector:	for use with GSM900/1800 antenna
Power supply AS541/4V	230V power supply connector with integrated security 2x2,5A
Power supply AS541/2V	Connection for power cable; 7,5V and 3A
Ground:	Screw fixation M5. Mark:

Power supply connection:

AS541/2V: through power supply which is included
AS541/4V: through power cable which is included

Antenna connection

The antenna (GSM900/1800) must be connected to the BNC or SMA-connection. Inside the AS54X, 2 or 4 GSM-channels are connected to eachother through an internal antenna splitter.

It is very important that the antenna is installed on a location where the GSM-network coverage is sufficient – this can be checked with the monitoring program (see configuration software, maintenance, trace). Please also check carefully that antennas are not installed nearby technical devices/cables etc which could influence the GSM-radiation.

COM-port (RS232) Interface

The 9 pol. SUB D connector on the front side of AS54X is used for the serial data connection between a PC/laptop and the AS54X. Through this COM-port the AS54X can be programmed. The PC configuration software is needed for this. This is free downloadable through the MCS-website, **www.mcs-nl.com/downloads**

PC configuration software is explained on page 8 or on the INFO-datei "541_soft.pdf", which you will download as well through the above website. You need Acrobat Reader 4.0 for reading this.

Explanation of LED's

With the help of the LED-indicators on the front side of the AS54X, multiple operation modes can be read, without starting the service programme. The following LED-indicators are possible and can be read as follows:

General setting after installing:

All LED's on:	Boot loader test integraty of the firmware + Light test
All red LED's flashing:	Firmware is incorrect and no download programme possible
Red and green S0 LED's on and Both red GSM LED's on	Saving the download programme
Red and green S0 LED's on and Red GSM1 LED on:	ID-error of the EEPROM

S0-LED's

Green LED's:	continously on	S0/T0 connection is correct
	Fast flashing	S0/T0 connection is incorrect
Red LED's:	coninously on	GSM-channel has connection with the network
	Fast flashing	A GSM-call takes place over this GSM-channel

LED's from the GSM-channels

Red and green LED's for one second on	GSM-channel is installed
Green LED continously on	GSM-channel has connection with the network and is ready for telephone call
Green LED is flashing slowly	GSM-channel does not reach the programmed minimum network quality
Green LED is flashing quickly	GSM-channel is being used (call is being made or is built up)
Red LED 1x flashing	GSM-channel is missing or defective
Red LED 2x flashing	GSM-channel does not have a SIM or SIM is not recognized
Red LED 3x flashing	SIM is not ready, requires not a PIN or PUK is required
Red LED 4x flashing	SIM requires a PIN-code, in the AS54X is however not a PIN code programmed
Red LED 5x flashing	the PIN-code programmed in AS54X is incorrect
Red LED 6x flashing	Last trial for entering PIN-code (will not be performed by AS54X)

Red LED 7x flashing	Reset from GSM-channel, because it was not logged on the network for 2 minutes
Red LED 8x flashing	Incorrect choise of GSM-operator, logging on not possible, no reception, antenna error
Red LED 9x flashing	SIM-lock error
Red LED 10x flashing	Error in data transmission with GSM-channel

The AS541/2V has one ISDN-channel and uses GSM 1/1 and GSM 1/2.
The AS541/4V has two ISDN channels, ISDN1 and ISDN2. To these ISDN channels belong GSM-channel 1/1 and 1/2 (for ISDN1) and GSM-channel 2/1 and 2/2 (for ISDN2). Each ISDN-channel and each GSM-channel can be programmed separately.

The RJ45 connections can be connected to an internal S0 or external S0 from the ISDN PABX.
It can be configured as 'Point to point' (P-P) or 'Point to mulitpoint (P-M-P). The point-to-point connection is to be preferred.

Supported ISDN-protocols are : EURO ISDN (DSS1) and QSIG

The programmation of the ISDN-protocols and how it should be connected to the PABX, is done through the configruation software.

Connection to external S0

Wenn an ISDN channel from the AS54X is configured as external S0/T0, then PIN3-6 are connected as NTBA.
The Western connection with 8 poles is connected 1:1 to the external S0/T0 from the PABX. Terminating resistors are integrated in the AS54X Interface.
The ISDN-channel from AS54X can operate on the following ways:

1) AS54X simulates a NTBA with point to point connection
2) AS54X simulates a NTBA with point to multipoint connection

As a point to point connection offers more comfort, this should always be tried first. This point-to-point connection has to correspond with the programmation of the S0/T0 of the PABX.

The point-to-multipoint connection should only be used when point to point is not possible. The following is applicable:

- only one PABX with external S0/TO could be connected. The subscribers may not be connected with this S0 directly. Subscribers can not be connected directly to this S0, because the AS54x gives no power.
- The parameters 'prefix for DTMF suffix dialling' and 'Amounts of digits for DTMF suffix dialling' should be entered. These parameters have to correspond with the dialnumbers, which are known to the PABX.

Connection to subscriber

If the AS54X is configured as a subscriber, then PIN3-6 from the RJ45 plug are connected as subscriber.
The Western connection with 8 poles is connected 1:1 to the standard S0-port of the PABX. Terminating resistors are integrated in the AS54X Interface.

Connection as S0-subscriber
The ISDN-channel from the AS54X can be programmed as a standard ISDN S0-Telephone to the internal S0-port from the PABX. The AS54x can be programmed in such a way that it reacts on multiple numbers.

Connection as SO Tie line

When the ISDN-channel of the AS54x is programmed as a tie line, then the PABX needs to be programmed that way as well. This way of connection can only be done in co-operation with a specialist of the specific PABX.

When programming as tie line, the AS54x can be programmed both as slave (synchronisation comes out of the PABX) or as master (sync comes out of AS54x). RJ45-connection with Master is identique to internal S0/T0.
Priority has the AS54x as slave connection. This prevents synchronisation problems, which might exist on specific PABX's.

Outgoing calls into the GSM-network

The way of building op a conversation from the PABX to the GSM-network differs per ISDN-connection:

Connection as external S0/T0
After dialling the specific trunk on which the AS54x is connected, the AS54x gives a dial tone (or text or message). Some PABX do not allow this dial tone or text/message.
When hearing the dial tone, the complete GSM-number can be entered. This can be done digit by digit, but also via the short codes of the PABX.

Connection to internal SO:
As subscriber
After the subscriber number on which the AS54x is connected has been dialled, the AS54x gives a dial tone (or text or message). Then via DTMF the GSM-number can be dialled accordingly.
The Gateway starts dialling after a specific pre-programmed time, after a specific pre-programmed number of digits or after the # sign.
When multiple MSN-numbers are programmed in the AS54x, then it is possible to connect these numbers to a specific GSM-number. As soon as the AS54x is called under the specific MSN-number, it will automatically then dial to the pre-programmed GSM-number.

As Tie line
When the ISDN-channel of the AS54x is connected as tie line, then each extension that is connected on the PABX, is able to to dial a GSM-number after choising the number of the tie line. DTMF is not required and the short codes from the PABX can be used.
Routing table
Through the configuration software, it is possible to indicate via which GSM-module an outgoing conversation should take place. There are 2 possiblities:

- on the basis of the number that has to be dialled (called party)
- on the basis of the number of the person who want to make the conversation (calling party)

The choice is made on the basis of the first x numbers. A maximum of 20 entries is possible. For specific, or al undefined conversations, the building up of the conversation can be blocked.

Incoming calls from the GSM-network

Incoming calls can be handled in different ways. This does not influence the method of connecting the AS54x to the PABX.

An incoming call will be automatically answered by the AS54x.
The caller will, independent of the settings, hear either tones, a melody or a message. After this the caller can choose the preferred extension by using DTMF. Please note, that at the moment the AS54x answers the call, the caller will already have to start paying.

Choosing when occupied:
If the caller gets a phone which is busy, first he will hear a busy-tone, after which the AS54x will repeat the tone/melody/message. The caller can then choose another number using DTMF.

Choosing when internal S0 is absent or occupied
When the specific chosen phone doesn´t answer, the caller can use the code ´*0´ to switch back to the tone/melody/message after which he can use DTMF to choose another extension. This code can also be used while calling.

Dialing in

In the AS54x it is possible to program an extension to which each incoming call will be routed without delay.

In the ´extended number list´ it´s even possible for each caller to program a route to a fixed extension.

Dialing in with delay

Here the call is answered by the AS54x first and the caller gets the option to choose an extension. If the caller doesn´t choose an extension, the caller will be automatically routed to the preset extension.

Configuration of AS54x Interface

For configuring all versions of the AS54x you need to install the “AS54x-Service” software. The program is suited for Windows 9x, NT, 2000 and XP.

The configuration software is available for free at: **www.mcs-nl.com/downloads.htm**

Stand-alone fuctionality

The AS54x has multiple monitoring functions. Errors in datatransport with the PABX or with the logging out of a GSM-module are recognized. That connection/module will be turned off for a short while and then reactivated a few moments later.

Documentation

Using the menu `traces´ you can start a diagnosis and then save this. This file can be used for error analysis by sending in to MCS via email.
For an analysis of the S0/T0 the AS54x has to be connected via RS232 to a PC, where the AS54x has to be connected to the PABX as well.

Remote control

By setting the switch ´remote access´, it´s possible to use SMS to remotely make a trace of the AS54x. The sim card has to be suitable for sending SMS messages.
More information about remote control is available through your supplier of through MCS.

Technical specifications

GSM modules:

Type:	WAVECOM Dual-Band Modul GSM-Phase II
Frequency range:	890-915 / 935-960 MHz (GSM900) 1710-1785 / 1805-1880 MHz (DCS1800)
Current power:	2W (GSM900 – Class 4) 1W (DCS1800 – Class 1)
Sensitivity:	-106dBm W
SIM:	3V Plug-in SIM with or without PIN code
ISDN:	internal S0 with EuroISDN protocol Tie Line with EuroISDN or QSIG protocol NT simulation Point-Point or Point-Multipoint with EuroISDN protocol
Data/fax:	currently not supported

Connections:

ISDN:	RJ45 (8-polig Western??)
Service:	9 pol. Sub D RS232 IBM-compatibel

	Power supply	Current	Antenna-connection	Size
AS541/2V	External Adaptor, 7,5V DC – 3A	Max 2.5A	SMA	19”, 1HU 485 mm x 45 mm x 245 mm
AS541/4V	90 – 254 V AC 50/60 Hz	Max 1.8A	BNC	19”, 1HU 485 mm x 45 mm x 245 mm

Technical changes possible!