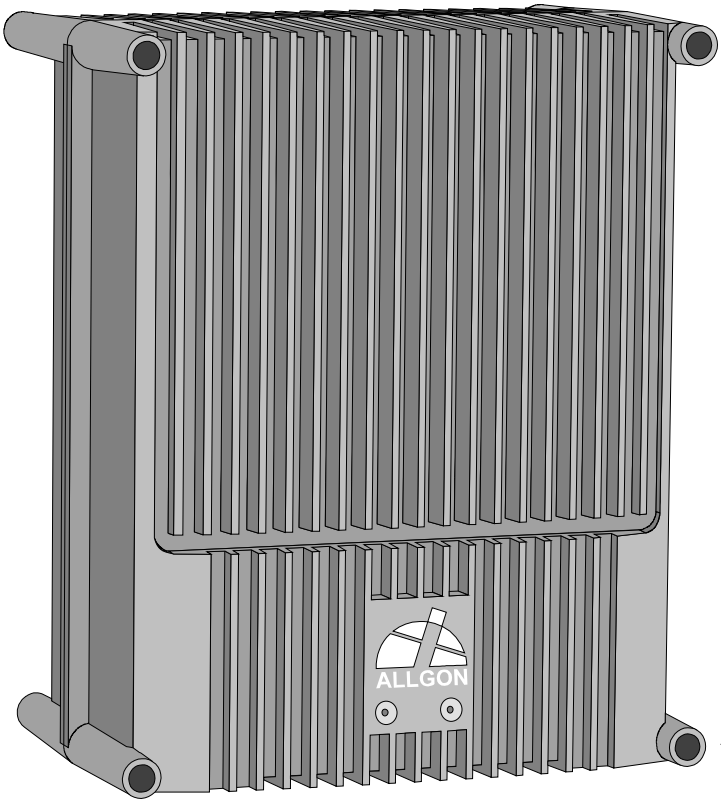
User's Manual

AR Repeaters & OMT32



Channel Selective & Band Selective Repeaters

VD202 90/EN

OMT32 Version R1A - English

User's Manual

AR Repeaters & OMT32

Channel Selective & Band Selective Repeaters

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OMT32 Version R1A

English

This manual describes installation, commissioning, usage, function, operation and maintenance of the Allgon AR repeaters and the Allgon OMT32 software version R1A. The first part of the manual describes the repeater hardware and the second part describes the OMT32 software.

Communication between Allgon AR repeaters and operators is carried out either by using Allgon OMT32 (Operation and Maintenance Terminal), or Allgon OMS (Operation and Maintenance System), both developed by Allgon. OMT32 is described in this manual. OMS is described in the *Advanced Repeater OMS, User's Manual.*

Hardware and software mentioned in this manual are subjected to continuous development and improvement. Consequently, there may be minor discrepancies between the information in the manual and the performance and design of the hardware and software. Specifications, dimensions and other statements mentioned in this manual are subject to change without notice.

In this system, the channel selective 900, 1800, and 1900 systems are called GSM, DCS and PCS respectively. These systems may, however, have different names in different parts of the world.

In this manual, the '<>' brackets are used to indicate function keys contrary to a series of key strokes
'<Del>' = the Del(ete) key, 'Del' = D, e, l.

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New Features in OMT32 Version R1A

- 32 bit software for fast and reliable operation.
- OMT32 cannot longer be run under Windows 3.x.
- OMT32 is compatible with all repeaters – new ones as well as old ones (old repeaters keep the original functionality).
- A new optional *Repeater to Repeater Link* feature is supported by OMT32.
- Improved user interface with intuitive menu options and buttons.
- Simplified OMT32 database.

Abbreviations

Abbreviations used in this manual, in the software, and in the repeater:

AGC	Automatic Gain Control
ALI	Alarm Interface board
AMPS	Advanced Mobile Phone Service
BCCH	Broadcast Control Channel (GSM broadcast channel time slot)
BS	Base Station, BS antenna = towards the base station
BSA	Band Selective Amplifier board for uplink or downlink band with fixed or adjustable band width
BSel	Band Selective
CDMA	Code Division Multiple Access
CHA	Channel Amplifier board with 2 channel selective uplink or downlink channels
CMB	Combiner unit
CSA	CDMA Segment Amplifier board with 2 channel selective uplink or downlink channels
CSel	Channel Selective
CU	Control Unit board
CW	Continuous Wave
DAMPS	Digital Advanced Mobile Phone Service
DC	Directional Coupler
DCS	Digital Communication System (same as PCN)
DIA	Distribution board
DL	Downlink signal direction (from base station via repeater to mobile station)
DPX	Duplex filter
EEPROM	Electrical Erasable Programmable Read Only Memory
EGSM	Extended Global System for Mobile communication
ETACS	Extended Total Access Communication System
ETSI	European Telecommunications Standard Institute
GSM	Global System for Mobile communication
HW	Hardware
LED	Light Emitting Diode
LNA	Low Noise Amplifier, uplink and downlink
MS	Mobile Station, MS antenna = towards the mobile station
MSC	Mobile Switching Center
NMT	Nordic Mobile Telephone system
OMS	Operation and Maintenance System
OMS/PC	Desktop or notebook with installed OMS software
OMT32	Operation and Maintenance Terminal
OMT32/PC	Desktop or notebook with installed OMT32 software
PA	Power Amplifier board for uplink or downlink
PCN	Personal Communication Network (same as DCS)
PCS	Personal Communication System
PSU	Power Supply Unit
PTFE	Polytetrafluoro Ethylene (Teflon)
RCU	Remote Control Unit
RF	Radio Frequency
RIA	Repeater to Repeater Interface Adapter
RSSI	Received Signal Strength Indication
RTC	Real Time Clock
SW	Software
TACS	Total Access Communication System
TDMA	Time Division Multiple Access
TMN	DeTe Mobile Network
UL	Uplink signal direction (from mobile station via repeater to base station)
UPS	Uninterruptible Power Supply

Part 1 – Hardware

Part one of this manual describes the Allgon AR repeaters, i.e. the hardware.

Part one includes Chapter 1 through Chapter 5.

The OMT32 software is described in part two of the manual, starting with Chapter 6, *OMT32 Installation*.

1. Safety

Any personnel involved in installation, operation or service of the Allgon repeaters **must** understand and obey the following:

- Allgon repeaters are designed to receive and amplify signals from one or more base stations and retransmit the signals to one or more mobile stations. Also, the repeaters are designed to receive signals from one or more mobile stations, amplify and retransmit to the base stations. The repeaters must be used exclusively for these purposes and nothing else.

- Repeaters supplied from the mains must be connected to grounded outlets and in conformity with any local regulations.

- The power supply unit in repeaters supplied from the mains contains dangerous voltage level, which can cause electric shock. Switch the mains off prior to any work in such a repeater. Any local regulations are to be followed when servicing repeaters.

  Authorized service personnel only are allowed to service repeaters while the mains is switched on.

- The repeater cover must be secured in opened position, e.g. by tying it up, at outdoor repeater work. Otherwise, the cover can be closed by the wind and cause your fingers getting pinched or your head being hit.

- When working on a repeater on high ground, e.g. on a mast or pole, be careful not to drop parts or the entire repeater. Falling parts can cause serious personal injury.

- Any repeater, including this repeater, will generate radio signals and thereby give rise to electromagnetic fields that may be hazardous to the health of any person who is extensively exposed to the signals at the immediate proximity of the repeater and the repeater antennas.

BERYLLIUM OXIDE

- The CHA channel board power transistors, the PA amplifier board power transistors, and the combiners (CMB) contain beryllium oxide (BeO) that is poisonous if present as dust or smoke which can be inhaled. The power transistors mentioned are mounted with two screws as opposed to other transistors.

  Do not file, grind, machine, or treat these parts with acid.

  Warning signs are applied on boards and units that contain beryllium oxide. These warning signs are shown in the next section.

HYDROGEN FLUORIDE

- The coaxial cable insulation is made of PTFE, polytetrafluoro ethylene, that gives off small amounts of hydrogen fluoride when heated. Hydrogen fluoride is poisonous. Do not use heating tools when stripping off coaxial cable insulation.

  No particular measures are to be taken in case of fire because the emitted concentration of hydrogen fluoride is very low.

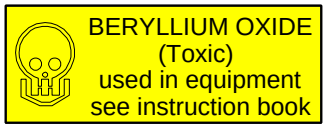
- A lithium battery is permanently mounted on the CU board. Due to the risk of explosion, this battery must not be removed from the board. In case of battery malfunction, replace the CU board. The old CU board can be sent to Allgon for repair.

Warning Signs

The following warning signs must be observed and be kept clean and readable.

Beryllium oxide

This warning sign is applied on boards and units which contain beryllium oxide parts.



This warning sign is applied at the bottom, inside the cabinet, below the power supply unit.

The previous section details parts containing beryllium oxide and how to avoid dangerous dealing with these parts.

Static Electricity

Static electricity means no risk of personal injury but it can severely damage essential parts of the repeater, if not handled carefully.

Parts on the printed circuit boards as well as other parts in the repeater are sensitive to electrostatic discharge.

Never touch printed circuit boards or uninsulated conductor surfaces unless absolutely necessary.

If you must handle printed circuit boards or uninsulated conductor surfaces, use ESD protective equipment, or first touch the repeater chassis with your hand and then do not move your feet on the floor.

Never let your clothes touch printed circuit boards or uninsulated conductor surfaces.

Always store printed circuit boards in ESD-safe bags.

2. Introduction

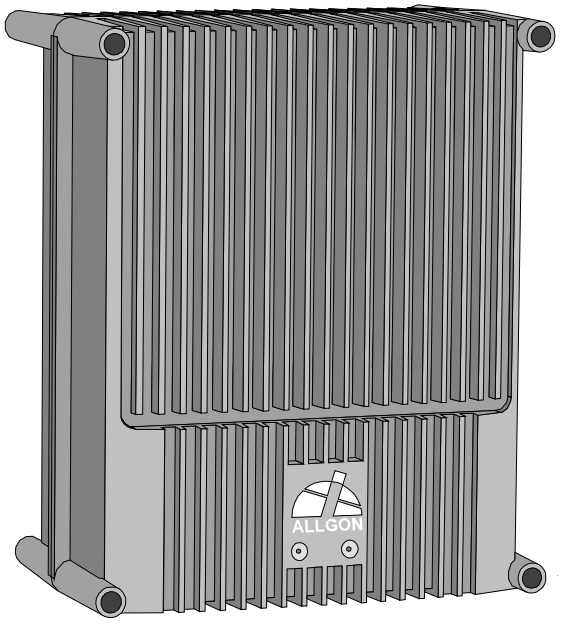


Figure 2-1. Allgon AR Repeater

Allgon repeaters are used to fill out uncovered areas in cellular mobile systems, such as base station fringe areas, road tunnels, business and industrial buildings, etc.

A repeater receives signals from a base station, amplifies and retransmits the signals to mobile stations. Also it receives, amplifies and retransmits signals in the opposite direction. Both directions are served simultaneously.

To be able to receive and transmit signals in both directions, the repeater is connected to a donor antenna directed towards the base station and to a service antenna directed towards the area to be covered.

Control of the repeaters is performed using a desktop or notebook loaded with the Allgon OMT32, *Operation and Maintenance Terminal*, which can communicate with the repeaters, either locally or remotely via modem. Remote operation can be performed either via a traditional telephone line or via a mobile phone that can be installed inside the repeater.

To be able to control many Allgon AR repeaters in common, there is an Allgon OMS, *Operation and Maintenance System*.

The repeaters and the OMT32 is described in this manual. The OMS is described in the *Advanced Repeater OMS, User's Manual*.

Repeater Types

The following repeater types are available:

- Channel selective GSM repeater
- Channel selective CDMA repeater
- Band selective repeater with fixed band width
- Band selective repeater with adjustable band width
- Combined repeater

☞ *In the OMT32, the channel selective 900, 1800, and 1900 systems are called GSM, DCS and PCS respectively, even though these systems may have different names in other parts of the world.*

Channel selective GSM repeater

A channel selective GSM repeater can be equipped with two, four, six or eight channels. This repeater type is used for channel selective systems, such as GSM, DCS/PCN and GSM 1900 (PCS).

Channel selective CDMA repeater

A channel selective CDMA repeater can be equipped with one or two channels. This repeater type is used for digital code division systems in accordance with IS-95 or J-std-008 standard.

Band selective repeater, fixed band width

A band selective repeater with fixed band width has fixed filters for a certain band width. This repeater type is used for analog or digital systems, such as NMT, TACS/ETACS, AMPS, DAMPS and CDMA.

Band selective repeater, adjustable band width

A band selective repeater with adjustable band width has filters that can be set to various band widths. This repeater type is used for analog or digital systems, such as NMT, TACS/ETACS, AMPS, DAMPS and CDMA.

Combined repeater

Some of the above mentioned types can be combined in the same repeater chassis and be in operation in parallel.

Using Repeaters

In areas where the radio signal propagation is poor repeaters can be used to fill out those areas which are not covered by the base station.

The following scenarios are examples on this:

- Sports arenas
- Fair halls
- Large shopping centres
- Road and railway tunnels
- Indoors in buildings with metal or concrete walls

Other examples where repeaters can be used to increase the coverage are:

- Shaded areas
- Fringe coverage areas

In areas where the traffic intensity is low, it is not cost efficient to install a base station. An Allgon repeater, which can be installed with a minimum of investments, is a much better solution. You save installation costs as well as operational costs.

Examples of using repeaters

Two examples are described in the following sections. An outdoor example in a shaded valley and an indoor example in a sports arena.

Shaded Area

A valley is shaded by hills. There is a base station 5 kilometers away, but the lowest signal strength in the valley is less than –100dBm. A mast used for other purposes is available for a repeater installation. The mast height is 42 meter and it is located on a hill. The scenario is illustrated in Figure 2-2.

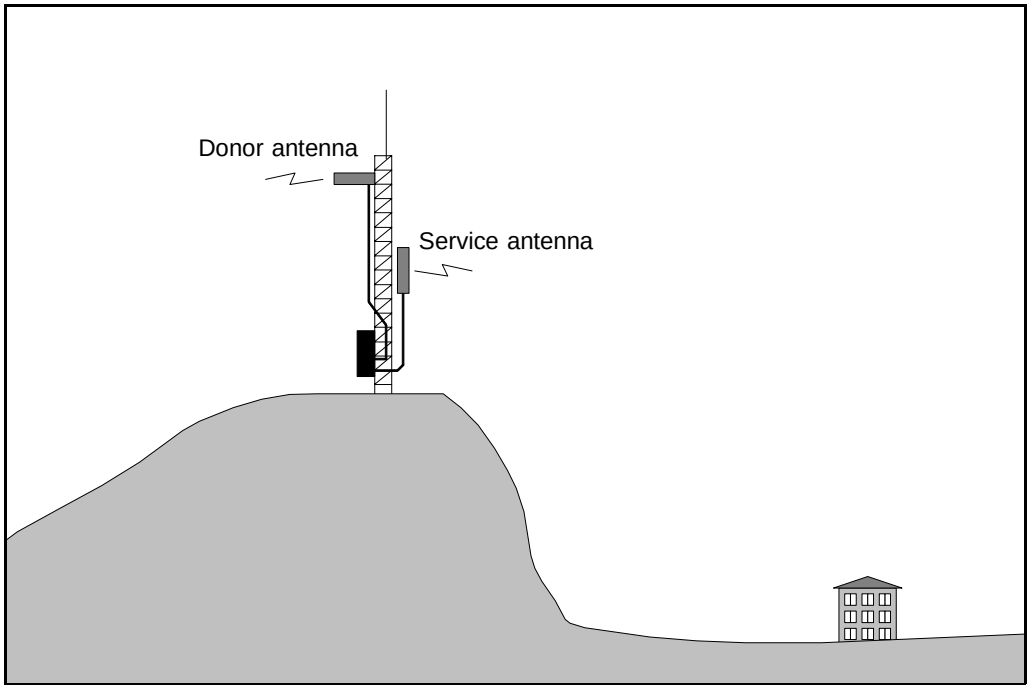


Figure 2-2. Repeater coverage of shaded area

The donor antenna of the repeater was mounted at the top of the mast and the service antenna was mounted at the half mast. The antenna isolation was measured to over 100dB. The repeater was set to max. 80dB gain.

Measured levels:	Received signal level	– 60.0 dBm
	Donor antenna gain	15.0 dBi
	Cable loss	– 5.0 dB
	Repeater input level	– 50.0 dBm
	Adjusted repeater gain	70.0 dB
	Repeater output level	20.0 dBm
	Cable loss	– 5.0 dB
	Service antenna gain	8.0 dBi
	Radiated output level	23.0 dBm

The measured result in the valley was better than –90dBm.

Sports Arena

A 2000 spectators sports arena with metallic roof had an indoor signal strength too low to provide a fair service in most parts of the arena. The nearest base station was 8 kilometers away and it was equipped with one carrier only.

A donor antenna directed towards the base station was mounted on a mast outside the building and a repeater was installed inside the building with the service antenna on the arch vault. The scenario is illustrated in Figure 2-3.

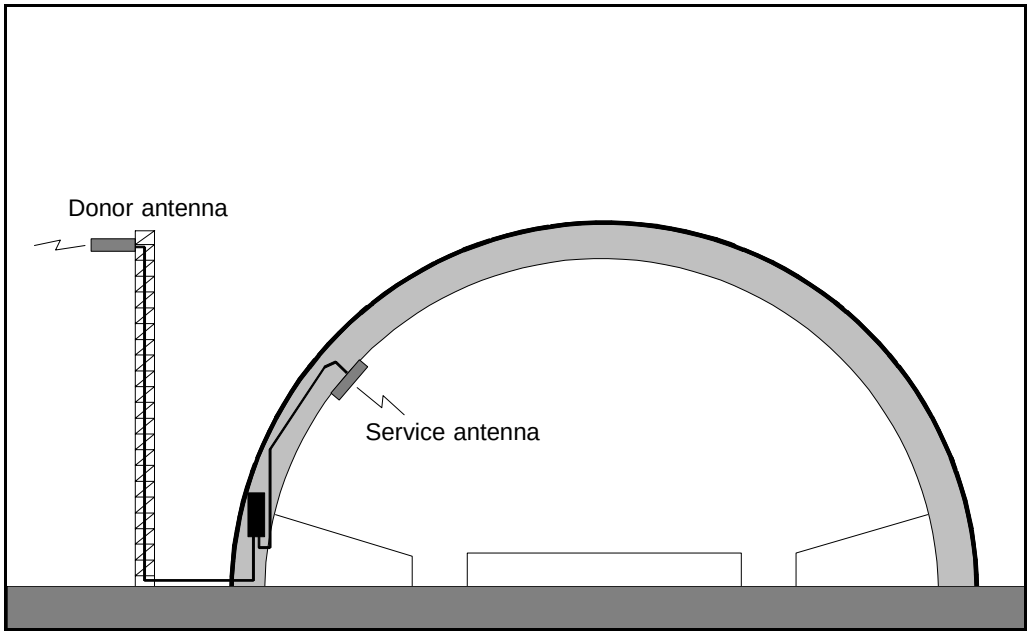


Figure 2-3. Repeater in sports arena

The antenna isolation was measured to over 85dB.

Measured levels:	Received signal level	– 80.0 dBm
	Donor antenna gain	15.0 dBi
	Cable loss	– 5.0 dB
	Repeater input level	– 70.0 dBm
	Adjusted repeater gain	75.0 dB
	Repeater output level	5.0 dBm
	Cable loss	– 2.0 dB
	Service antenna gain	7.0 dBi
	Radiated output level	10.0 dBm

The signal strength was fair for service in the entire arena.

3. Installation

Before installation, read carefully Chapter 1, *Safety*.

Siting the Repeater

Allgon repeaters are designed for outdoor usage. However, humidity and temperature changes may have affect on the reliability. A preferable site for the repeater is thus indoor, in a tempered and ventilated room.

Sunshine

If a repeater is placed outdoor and can be exposed to direct sunshine, it is essential that the air can circulate around the repeater with no obstacle.

The operating temperature must not exceed +55°C due to sunshine exposure. A shelter must be used in this case.

Shelter

Allgon repeaters are designed with a weather proof outdoor case that can be mounted without any kind of shelter from rain, snow or hail.

If a repeater is to be opened on the site when raining, snowing, or hailing there must be some kind of permanent or temporary shelter. This is applicable to gentle rainfall, snowfall or hail. Limitations for very bad weather is found in the next section.

Allgon can provide a shelter designed for these repeaters. This shelter is shown in Figure 3-1.

Outdoor Installation and Service Limitations

Sited outdoors, the repeater **must not be opened** for installation or service at bad weather, such as:

- Intense rainfall, snowfall or hail
- Storm or high wind
- Extremely low or high temperature
- High humidity of the air

Dimensions and Weights

The dimensions of the repeater, including the mounting bracket, is shown in Figure 3-1. The repeater chassis consists of two main parts, a **cabinet** in which the circuitry is housed, and a **cover**, which can be either a thin cover or a large cover (see the figure) depending on the configuration.

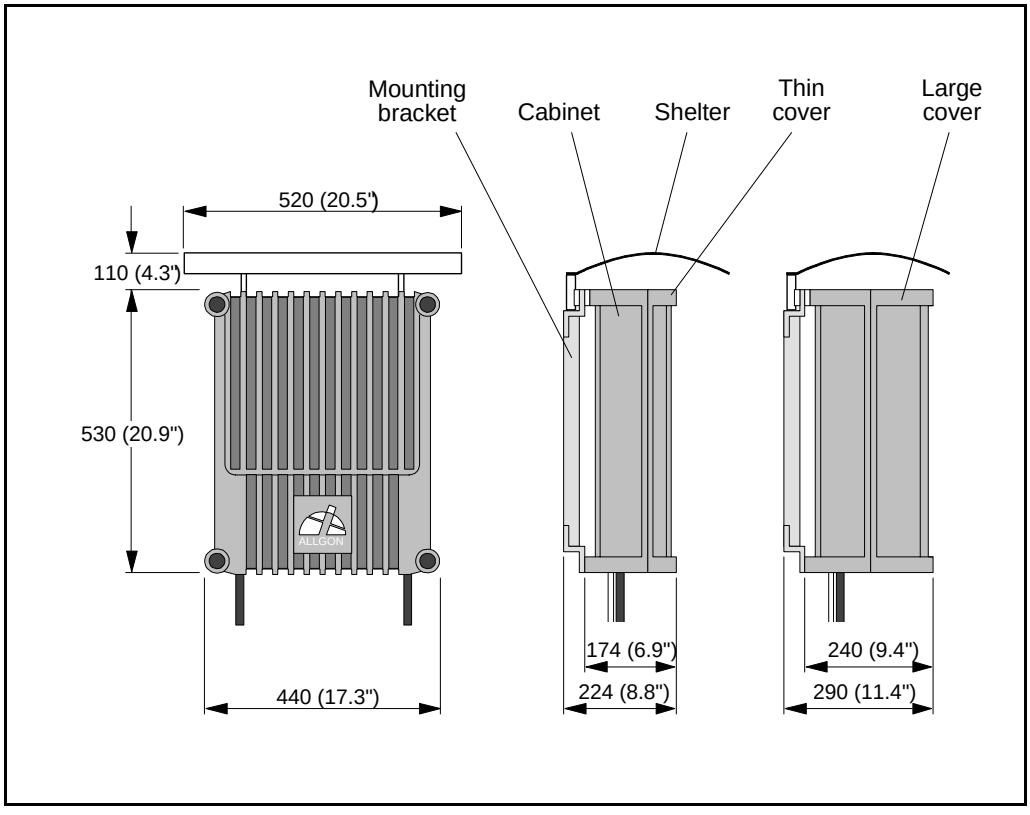


Figure 3-1. Repeater dimensions

Approximately repeater weights

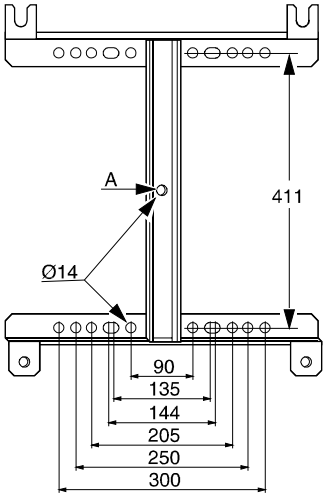
Channel selective repeater, four channels, thin cover ..... 21 kg (46 lbs)
Channel selective repeater, four channels, large cover ..... 25 kg (55 lbs)
Band selective repeater, thin cover ..... 21 kg (46 lbs)
Band selective repeater, large cover ..... 25 kg (55 lbs)
Channel/band selective combi repeater, large cover ..... 30 kg (66 lbs)

If the cover, for some reason, has to be lifted off the cabinet, disconnect the interconnection cables, remove the hinge nuts, and lift the cover off. *This is not recommended in other than exceptional cases.*

The cabinet and cover weights are, approximately, as follows:

Empty thin cover ..... 6 kg (13 lbs)
Empty large cover ..... 10 kg (22 lbs)
Equipped large cover ..... 15 kg (33 lbs)
Equipped cabinet without cover ..... 15 kg (33 lbs)

Mounting



An Allgon repeater is easy to mount using the provided mounting bracket, which has Ø14mm (9/16") holes for 10mm (3/8") or 12mm (1/2") fixing screws. Clamps with c-c measures of 90mm (3.5"), 135mm (5.3"), 144mm (5.7"), 205mm (8.1"), 250mm (9.8"), and 300mm (11.8") can be used as well. The vertical c-c measure for these are 411mm (16.2").

The mounting bracket is shown in the figure.

NOTE! There is a Ø14mm (9/16") single hole in the middle of the mounting bracket, marked 'A' in the figure, which is intended for a locking screw, i.e. a screw which cannot be removed when the repeater is put in the bracket.

Mount the repeater as follows:

1. Mount the provided bracket.

Normally, the repeater is mounted on a wall, pole, or mast. These mounting cases are shown below.

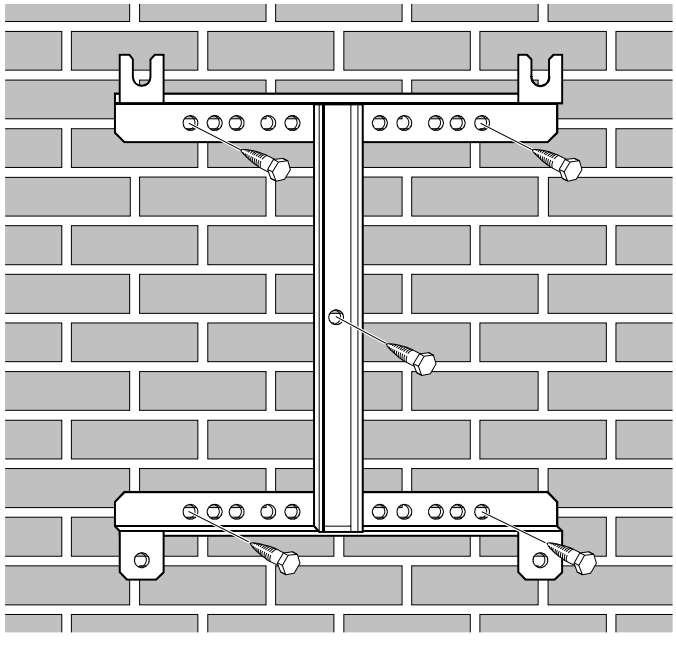


Figure 3-2. Attaching the bracket to a wall

Figure 3-2 shows a bracket attachment to a wall using four fixing screws and a locking screw.

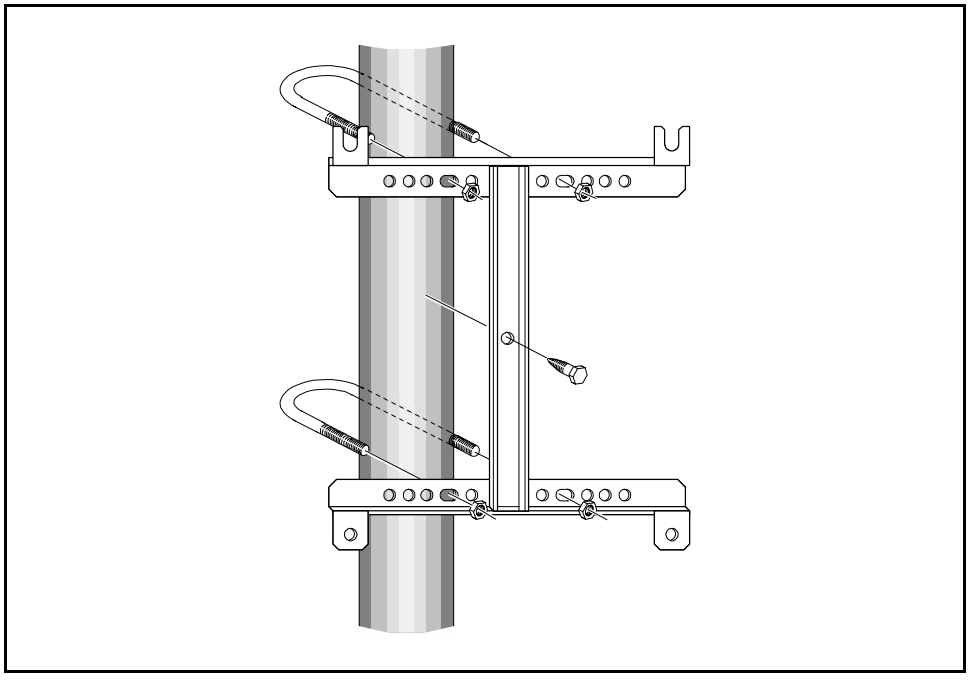


Figure 3-3. Attaching the bracket to a pole

Figure 3-3 shows a bracket attachment to a pole using two 144mm (5.7") U-shaped clamps and a locking screw.

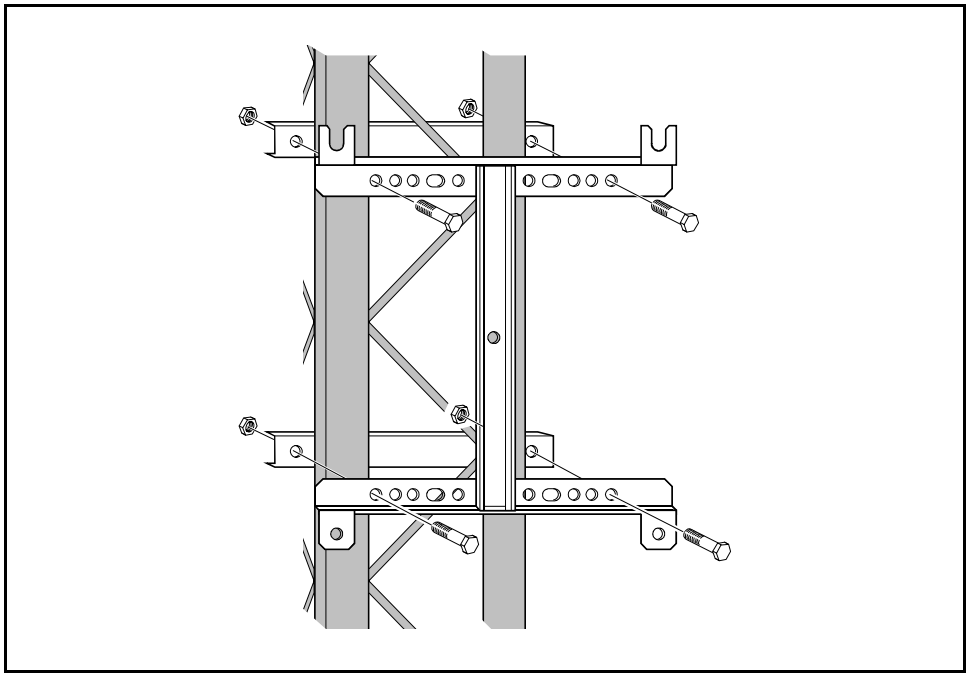


Figure 3-4. Attaching the bracket to a mast

Figure 3-4 shows a bracket attachment to a mast using two 300mm (11.8") bar-shaped clamps and no locking screw.

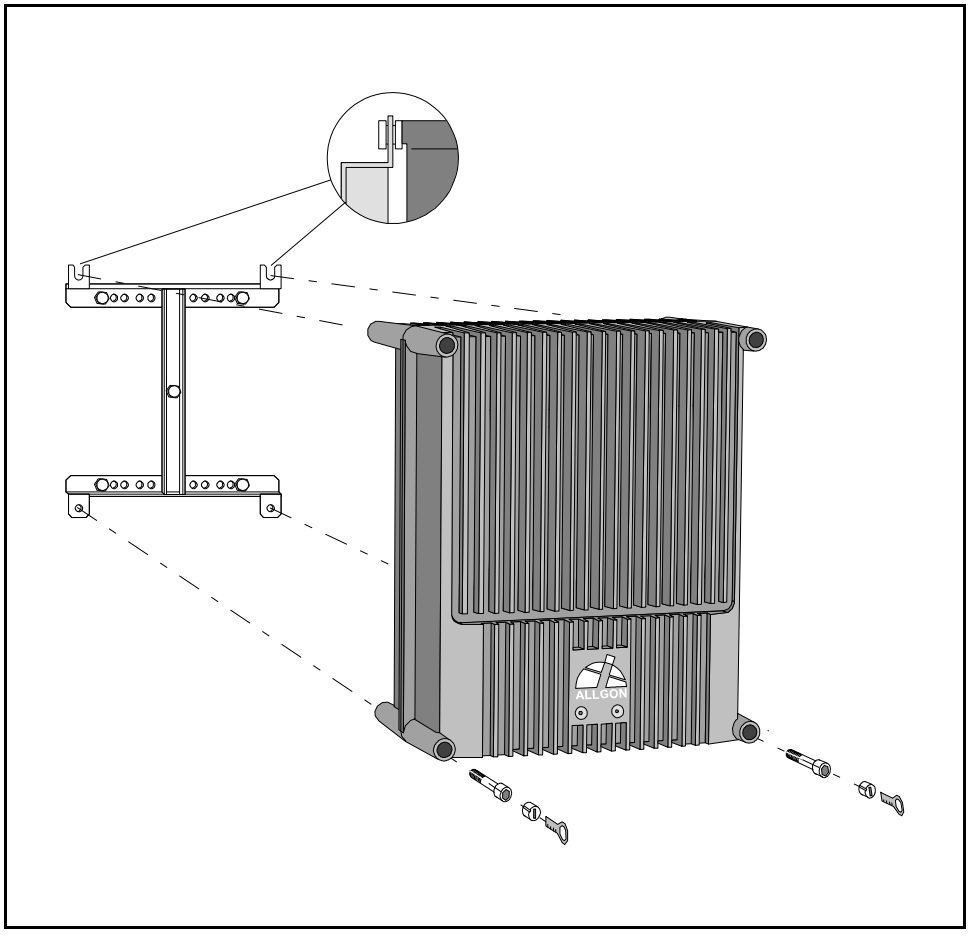


Figure 3-5. Attaching the repeater to the bracket

2. After attaching the bracket, hang the repeater on the upper supports (see Figure 3-5) and use the screws for the lower ones.

There are locking cylinders that can be inserted and locked with a key after the lower screws have been tightened (see Figure 3-5). These prevents from unauthorized removal of the repeater.

3. Mount the donor antenna directed towards the base station antenna. This antenna is marked ’BS’ in the repeater.

4. Mount the service antenna directed towards the area to be covered by the repeater. This antenna is marked ’MS’ in the repeater.

Connection

These labels show the GSM/NMT system frequencies as an example.

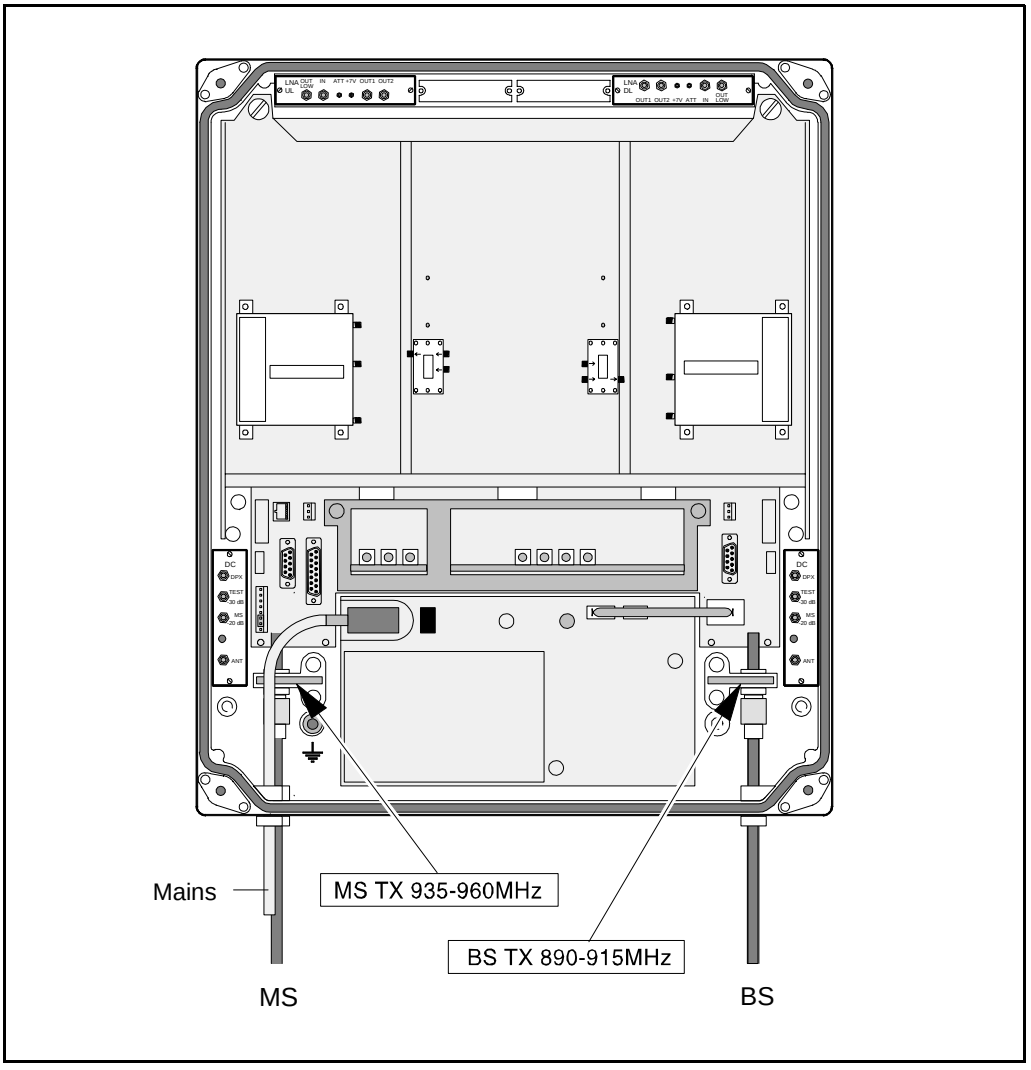


Figure 3-6. MS and BS antenna connections

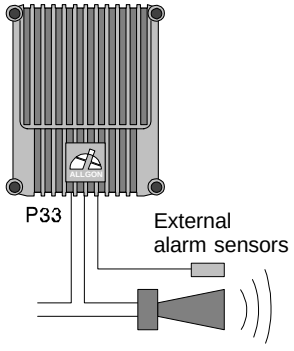
1. Connect the service antenna (MS) and donor antenna (BS) coaxial cables (see Figure 3-6). N type female connectors are used in the repeater.

The donor antenna (BS) is connected to the right in the cabinet, at the 'BS TX xxx-xxxMHz' label (xxx = system frequencies).

The service antenna (MS) is connected to the left in cabinet, at the 'MS TX xxx-xxxMHz' label (xxx = system frequencies).

2. Mount the mains connector on the cable and plug in the connector in the power supply unit, PSU.

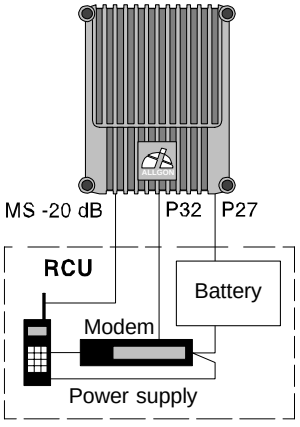
☞ *For repeaters supplied from the mains, the mains outlet must be grounded. Both the mains plugs of repeaters equipped with two power supply units must be connected to outlets supplied from the same fuse.*



3. Connect external alarm sensors (burglary, fire, etc.) and other external alarm equipment (optical or acoustic signal, etc.), if any. Cables for this installation is taken through free strain relief bushings on the bottom of the repeater, in the same way as the mains cable and the antenna cables.

External alarm is connected to the P33 alarm port located to the left in the cabinet (see Figure 3-7 on page 3-9). Use a 15 pole D-sub male connector.

The P33 port is described on page 3-11.



This is a schematic figure. The various RCU parts can be integrated or configured differently.

4. Connect the internal phone/modem unit for remote control of the repeater, if any.

The modem and a power backup unit are integrated in an RCU, Remote Control Unit, which is mounted downmost inside the cabinet, in front of the PSU. The RCU is available in different types for various systems, which is further detailed in the *Optional* section in Chapter 13.

The modem is connected to the P32 modem port (RS-232, V.24 interface) on the repeater located to the left in the cabinet (see Figure 3-7 on page 3-9).

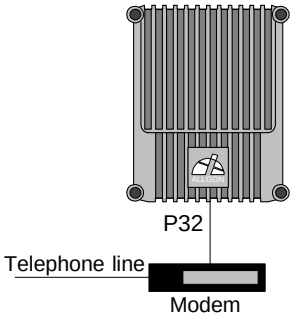
The P32 port is described on page 3-11.

The mobile phone antenna is connected to the MS –20dB port on the BS directional coupler (DC) located to the right in the cabinet (DC/BS), provided that the phone and the repeater operate in the same system.

If an RCU is used, this is powered by the P27 auxiliary port located to the left in the cabinet (see Figure 3-7 on page 3-9). Pin 2 and 3 of the P27 port are interconnected with a jumper if not used. This jumper must be removed before plugging the RCU connector to P27.

☞ *If the RCU is removed, the jumper between pin 2 and 3 on the P27 port must be reconnected. Otherwise, the CU and ALI boards will have no voltage supply. Do not connect the jumper to another position than between pin 2 and 3 on the P27 port.*

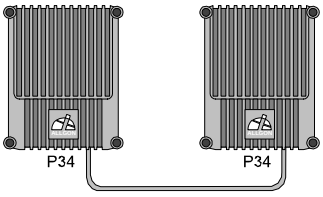
The P27 port is described on page 3-10.



5. Connect a telephone line for remote control of the repeater, if any. The telephone line is connected to a modem, which is connected to the P32 modem port on the repeater.

The P32 port is described on page 3-11.

Use a free strain relief bushing at the bottom of the repeater for the external telephone line cable.

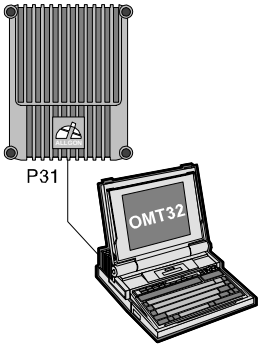


6. Connect the *Repeater to Repeater Link* cable, if this optional feature is to be used. The R2R net cable is connected to the P34 Repeater to Repeater Link port on the repeater via a connector board to the right in the repeater.

The P34 Repeater to Repeater Link port is described on page 3-13.

A free strain relief bushing at the bottom of the repeater is used for the external net cable.

Necessary information for a *Repeater to Repeater Link* installation is found in the VD202 91/EN, *R2R, Repeater to Repeater Link Kit, Installation Guide*.



7. Connect a PC for controlling the repeater. A COM port on the PC is connected to the P31 PC port (RS-232) located to the right in the cabinet (see Figure 3-7 on page 3-9). Use the provided serial cable.

Port P31 is described on page 3-10.

Now, you can use the OMT32 program to set up and control the repeater. The OMT32 program is described in part two of this manual.

But first, check the connections made and commission the repeater as described in Chapter 4.

Connection Ports and Station Ground

The DIA distribution board provides most of the internal connection between the repeater units, and to external ports. Connectors involved in the installation are also located on the DIA board. These connectors are described below. A complete DIA board connector list is found in the *Board and Unit Descriptions* section in Chapter 5.

Station ground is detailed below as well.

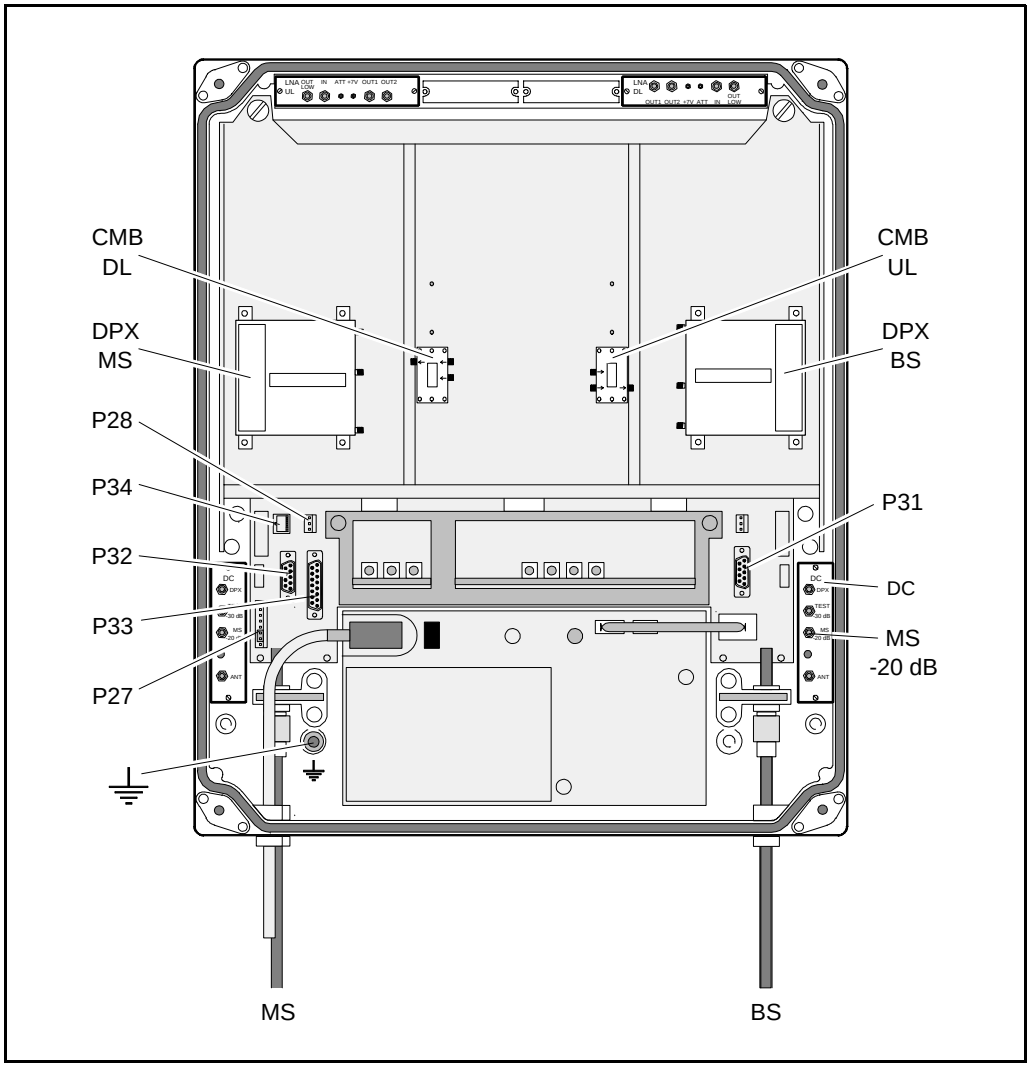
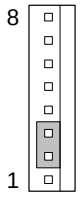


Figure 3-7. Connection ports and station ground

Station Ground

There is a station ground screw (M8) in the repeater marked with a ground symbol (see Figure 3-7). This screw must be used only for station grounding (if such ground is to be used).

P27 Auxiliary Port



Auxiliary port P27 is used for powering an RCU mobile phone/modem remote control unit. The connector is found on the DIA board to the left in the cabinet (see Figure 3-7).

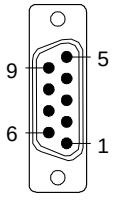
P27 is an 8 pole, 1 line male connector.

Pin 2 and 3 of the P27 port MUST ALWAYS be interconnected to provide the CU and ALI boards with voltage supply. If there is no cable connected to the P27 port, pin 2 and 3 MUST be interconnected with a jumper.

P27 auxiliary connector pinning

Pin 1	+7V DC
Pin 2	+7V DC
Pin 3	CU and ALI power supply from pin 2
Pin 4	GND
Pin 5	+26V DC or +10V DC depending on the repeater type
Pin 6	Not used
Pin 7	Output 200KHz reference
Pin 8	GND

P31 PC Port



PC port P31 is a RS-232 port used for local PC communication.

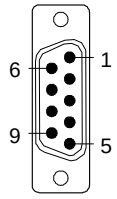
The connector is found on the DIA board to the right in the cabinet (see Figure 3-7).

P31 is a 9 pole D-sub female connector.

P31 PC connector pinning

Pin 1	Not used
Pin 2	Data from repeater to OMT32
Pin 3	Data from OMT32 to repeater
Pin 4	DTR from OMT32 to repeater
Pin 5	GND
Pin 6	DSR from repeater to OMT32
Pin 7	RTS from OMT32 to repeater
Pin 8	CTS from repeater to OMT32
Pin 9	Not used

P32 Modem Port



Modem port P32 is a RS-232 port with V.24 interface used for remote control of the repeater.

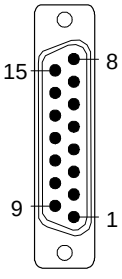
The connector is found on the DIA board to the left in the cabinet (see Figure 3-7).

P32 is a 9 pole D-sub male connector.

P32 modem connector pinning

Pin 1 DCD
Pin 2 RXD
Pin 3 TXD
Pin 4 DTR
Pin 5 GND
Pin 6 DSR
Pin 7 RTS
Pin 8 RFS
Pin 9 RI

P33 Alarm Port



Alarm port P33 is used for external alarm sensors and alarm equipment.

The connector is found on the DIA board to the left in the cabinet (see Figure 3-7).

P33 is a 15 pole D-sub female connector.

The port has four alarm inputs, EAL1 - EAL4, and two alarm outputs.

Four alarm inputs

The inputs are low-level inputs (signal AI1 - AI4) with common ground (AIC).

Use insulated switch or relay to initiate alarms (open switches in normal operating mode, closed switches cause alarm).

The alarm switch connection can be toggled between being active open or active closed. See the *Alarm Configuration* section in Chapter 11.

The alarm input voltage ratings, related to ground (AIC), are:

Vin_{max} = 5.5V
Vin_{min} = –0.5V

The alarm inputs are defined as follows:

Pin 14 AI1 External alarm input 1 - EAL1
Pin 15 AI2 External alarm input 2 - EAL2
Pin 7 AI3 External alarm input 3 - EAL3
Pin 8 AI4 External alarm input 4 - EAL4
Pin 6 AIC Ground

P28 - AI4 door switch alarm input

Normally, alarm input AI4 is used for repeater cover opening alarm EAL4, which is arranged using a door switch (optional). Because of that, AI4 and AIC are available also in the P28 connector, to which the door switch is connected. The location of the connector in the cabinet is shown in Figure 3-7.

The EAL4 door switch alarm is activated 10-30 seconds after the cover has been opened.

The other external alarms are activated 1 sec. after initiation.

Two alarm outputs

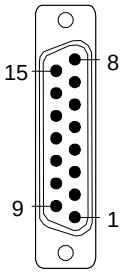
Both the alarm outputs are 1 pole closing and 1 pole opening relay outputs insulated from each other.

Maximum ratings, related to ground or any other alarm terminal, are 50VAC/60VDC.

The alarm outputs are defined as follows:

Pin 9-1	AO1-AO8	Closed when operating, otherwise open
Pin 10-2	AO6-AO7	Open when operating, otherwise closed
Pin 11-3	AO2-AO5	Closed at alarm state, otherwise open
Pin 12-4	AO3-AO4	Open at alarm state, otherwise closed

Alarms are activated by CRITICAL and ERROR alarms.



P33 alarm connector pinning

Pin 1	AO8
Pin 2	AO7
Pin 3	AO5
Pin 4	AO4
Pin 5	Not used
Pin 6	AIC
Pin 7	AI3
Pin 8	AI4
Pin 9	AO1
Pin 10	AO6
Pin 11	AO2
Pin 12	AO3
Pin 13	Not used
Pin 14	AI1
Pin 15	AI2

P34 Repeater to Repeater Link Port

The P34 port is used for *Repeater to Repeater Link* (R2R net), which is an optional feature for the AR repeaters.

The connector is found on the DIA board to the left in the cabinet (see Figure 3-7).

P34 is an 8 pole RJ45 modular female connector.

P34 Repeater to Repeater Link connector pinning

Pin 1	C/S
Pin 2	GND
Pin 3	D–
Pin 4	D+
Pin 5	D+
Pin 6	D–
Pin 7	GND
Pin 8	C/S

For further information about the *Repeater to Repeater Link* installation, refer to the VD202 91/EN *R2R, Repeater to Repeater Link Kit, Installation Guide*.

Mains Breakdown Relay

To be able to distinguish PSU faults from power failure, a mains breakdown relay must be used on the repeater mains supply.

The mains breakdown relay is not included in the repeater. So, it has to be mounted outside the repeater chassis. The relay intended for this purpose must fulfil the following specifications:

Relay specification

Closing time:	max. 30 milliseconds
Insulation coil/contact:	min. 4KV

Mains connected relay must be in compliance with valid local regulations.

Connection

- Connect a normally closed relay contact to pin AI1 and AIC on the P33 alarm connector (closed contact at no current). Alarm is initiated by short circuiting the AI1 and AIC inputs as shown in Figure 3-8. The P33 alarm connector is detailed on page 3-11.

- Connect the relay coil. It must be supplied from the same fuse as the repeater.

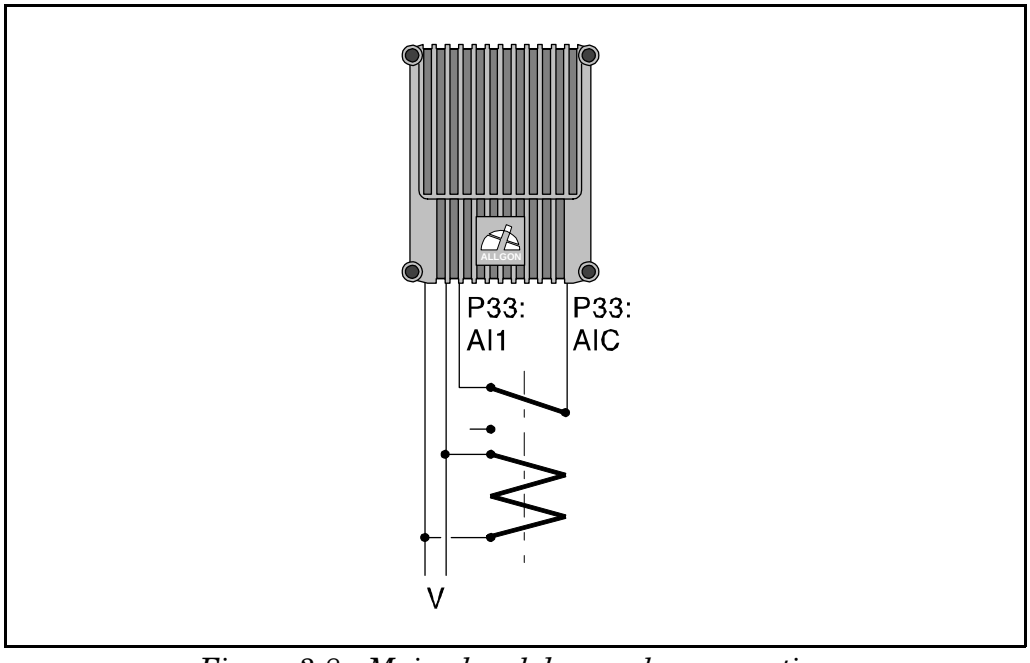


Figure 3-8. Mains breakdown relay connection

- After commissioning, select the *Mains breakdown* option in the *Alarm Configuration* dialog box described in the *Alarm Configuration* section in Chapter 11.

Installing 24 Volt or 48 Volt DC Power Supply Unit

You can replace the 220V AC PSU with a 24 Volt or 48 Volt DC PSU as follows:

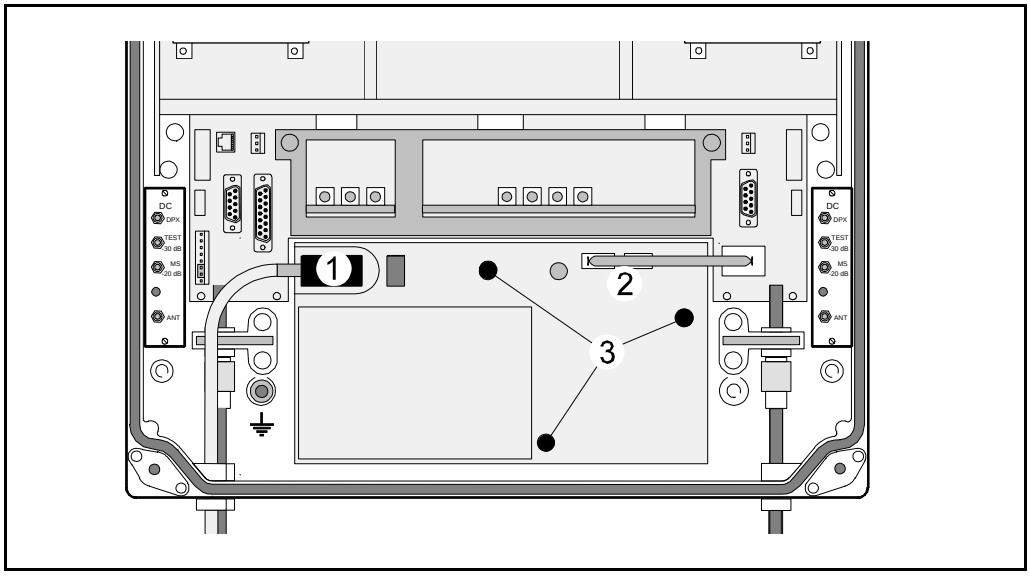
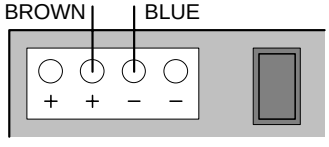


Figure 3-9. Replacing the PSU

1. Switch the repeater off and remove the mains plug from the PSU ('1' in Figure 3-9).
2. Disconnect the two connectors (2) on the PSU.
3. Loosen the three fixing screws (3) using a 5mm Allen key.
4. Remove the PSU from the repeater.
5. Mount the 24/48 Volt DC PSU with the three fixing screws (3).
6. Connect the PSU to the DIA board (2).



7. Connect the DC power cable. The supplied cable should have a radiation limiter. The cable shall be connected as follows:

   The **+** pole shall be connected to one of the left terminals in the PSU connector with the BROWN part of the DC cable.

   The **–** pole shall be connected to one of the right terminals in the PSU connector with the BLUE part of the DC cable.
8. Switch the repeater on.
9. The yellow LED on the PSU shall now be lit.

The DC Power Supply Unit must be galvanically separated from the mains supply with an equipment fulfilling the IEC65 safety requirements.

4. Commissioning

Read carefully Chapter 1 *Safety* before commissioning the repeater.

Check all connections made during the installation. Also, ensure that both the mains plugs for repeaters equipped with two power supply units are connected to outlets supplied from the same fuse.

To fulfill the IP65 weather protective requirements, ensure that the cable strain relief bushings are properly tightened. Also, ensure that the gaskets at the cable inlets and on the cabinet are properly fitted and not damaged.

When the installation is checked, commission the repeater as described below.

Starting the Repeater

1. Turn the mains switch on (marked 'S' in Figure 4-1).

2. Check the LED on the power supply unit (V). It must be lit with a steady yellow light.

3. Check the four **CU board** LEDs (see Figure 4-1). A correct power up is indicated as follows:

   PWR
   Yellow LED which is lit with a steady light after the mains is switched on. Indicates present power.

   BOOT
   Red LED which is lit with a steady light when the system boots, i.e. for 10 - 15 seconds after the mains is switched on. Then, it flashes for the next 5 - 10 seconds. After that, if no error is detected, the LED is off.

   ALARM
   Red LED which flashes 15 - 20 seconds after the mains is switched on. Then, it flashes for less serious alarms (ERROR) and is lit with a steady light for fatal alarms (CRITICAL).

   OPER
   Green LED which lights up approx. 15 seconds after the mains is switched on. It shows, with a steady light, that the repeater is ready for operation.

4. Check the three **ALI board** LEDs (see Figure 4-1). The LEDs follow the alarm relays. A correct power up is indicated as follows:

   OPER
   Green LED which has the same indication as the green LED on the CU board (see above).

   ALARM
   Red LED which is lit with a steady light for ERROR and CRITICAL alarms.

   PWR
   Yellow LED which has the same indication as the yellow LED on the CU board (see above).

External indicators on the repeater front

Yellow
Operation LED which lights up approx. 15 seconds after the mains is switched on. At steady light the repeater is ready for operation.

Red
Alarm LED which indicates ERROR alarms with flashing light and CRITICAL alarms with steady light.

When the indicators show operational mode, the repeater can be configured for operation by using an OMT32/PC. This is further detailed in the *Repeater Configuration* section in Chapter 10

Indicators

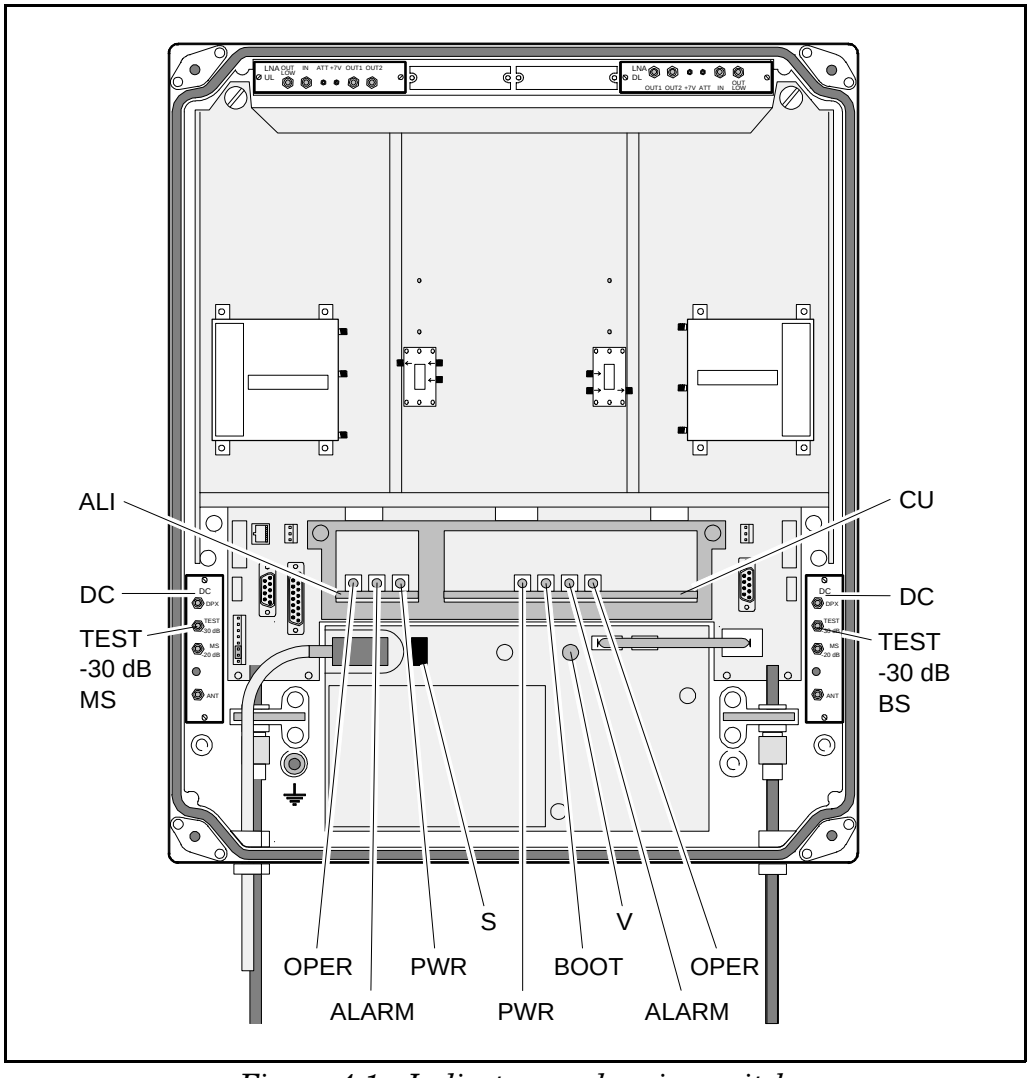


Figure 4-1. Indicators and mains switch

Figure 4-1 shows the repeater indicators and the mains switch. There are also two external indicators on the repeater front cover.

Repeater to Repeater Link indicators

Additional indicators are found in the repeater, if equipped with the *Repeater to Repeater Link* feature. For information about these indicators, refer to the VD202 91/EN *R2R, Repeater to Repeater Link Kit, Installation Guide*.

Measuring the Output Power Level

Uplink and downlink output power test ports are found on the directional couplers (DC) at the MS and BS antenna connectors. These test ports are marked TEST –30dB (see Figure 4-1) and are intended for measuring using e.g. a spectrum analyzer.

The coupling is –30dB approximately. There is no directivity in these test ports, i.e. both uplink and downlink signal can be measured.

Voltage Supply Testpoints

A number of voltage supply testpoints are available in the repeater. These testpoints are named U7A - U7F for the 7V supply voltages and U26 for the 26V or 10V supply voltage (26V or 10V depending on the repeater type).

A standard multi-meter can be used on these testpoints.

The testpoints are found on the DIA board in the repeater cabinet. The testpoint positions on the DIA board is detailed in the *Board and Unit Descriptions* section in Chapter 5.

If the repeater is equipped with a second PSU, e.g. for combined channel/band selective operation, the same set of testpoints are found on the cover DIA board as well.

Repeater Adjustment

The repeater is now ready to be adjusted in accordance with the site conditions and system performance requirements. Pay especial attention to the antenna isolation described in the *Operational Status* section in Chapter 10.

5. Functional Description

Allgon repeaters work as bi-directional on-frequency amplifiers.

A repeater receives, amplifies, and retransmits signals downlink and uplink simultaneously, i.e. from the base station via the repeater to the mobile stations and from the mobile stations via the repeater to the base station.

The repeater is connected to a BS antenna, directed towards the base station, and to a MS antenna directed towards the area to be covered. These antennas are connected to the repeater with N type male connectors.

To prevent instability due to poor antenna isolation, a built-in antenna isolation supervision feature reduces the gain level automatically when poor antenna isolation is detected.

The Allgon repeaters are controlled by powerful microprocessors.

Alarm and operational LEDs are visible on the repeater front.

The repeater works with convection cooling without fan.

Operational parameters such as gain, channel number, power levels, etc. are set using a desktop or notebook and the Allgon OMT32, which communicate, locally or remotely via modem, with the repeater control unit (CU). Remote operation is performed using a telephone line or a built-in mobile phone equipped with a data interface.

Repeater Design

The repeater is housed in a cast aluminium chassis that is waterproof, class IP65, for outdoor use. The chassis has a design suited for outdoor use as well as indoor use.

The chassis consists of a cabinet and a cover joined with hinges. The cabinet contains the repeater circuitry. The cover can either be a thin cover or a large cover. The latter consists of another cabinet which can be used as an empty cover or be equipped as an independent repeater system.

The cover has two external LEDs for operation and alarm indication.

The cabinet as well as a large cover can be equipped for channel selective operation or band selective operation. A combined repeater is normally equipped for channel selective operation in the cabinet and band selective operation in the cover.

Different amplifier boards are used to get the various operations (see below). The amplifier boards are individually shielded and located under metal cover sheets which can be folded out.

Channel selective GSM amplifier boards

Channel selective GSM repeaters can handle up to eight repeater channels (four if the CU part number is K103/1). For every even number of repeater channels, two CHA amplifier boards are required in the repeater, one CHA board for uplink signaling and one board for downlink signaling. Each repeater channel is allocated to a radio channel or switched off. In a GSM type TDMA system (GSM, EGSM, DCS1800 or PCS1900), one repeater channel can handle eight calls (sixteen if half-rate encoding is used).

Channel selective CDMA amplifier boards

Current CDMA repeaters can handle two CDMA repeater channels. For every even number of repeater channels, two CSA amplifier boards and two PA amplifier boards are required in the repeater, one pair of CSA/PA boards for uplink signaling and one pair for downlink signaling. Each repeater channel is allocated to a radio channel or switched off.

Band selective amplifier boards

Band selective repeaters can handle one wide band repeater channel. The band width is either fixed or adjustable (fixed for 900MHz repeaters only). A band selective repeater channel requires two BSA boards and two PA amplifier boards in the repeater. One pair of BSA/PA boards for uplink signaling and one pair for downlink signaling.

Other boards

In addition to the channel/band selective boards, the repeater contains:

- DIA Distribution board, which is a board on which all other boards and units are connected to.

  On the DIA board, there is a shielded metal frame in which CU and ALI boards are located.

  There is a DIA board in the cabinet, and another board in the cover, if equipped.

- CU Control Unit board, located in the frame on the DIA board.

  There is one CU board in the cabinet, which controls the entire repeater.

- ALI Alarm Interface board, located in the frame on the DIA board.

  There is one ALI board in the cabinet which handles alarm and alarm communication.

- DC Directional Coupler, located in shielded boxes which are formed as recesses in the cabinet.

  Two DC units in the cabinet are used as antenna signal directional coupler.

- LNA Low Noise Amplifier, located in shielded boxes which are formed as recesses in the cabinet.

  Two LNA units in the cabinet are used as downlink and uplink low noise amplifiers, and additional two LNA are used in the cover, if equipped.

- DPX Duplex filter, located on the cover plate over the channel/band selective boards.

- CMB Combiner unit, located on the cover plate over the channel/band selective boards in channel selective repeaters with more than two channels, and in combined repeaters.

- PSU Power Supply Unit, located downmost in the cabinet, and in the cover, if equipped.

If the repeater is equipped with an optional *Repeater to Repeater Link* feature, the following board is also included in the repeater (not valid to channel selective CDMA repeaters):

- RIA Repeater to Repeater Interface Adapter, located in the frame on the DIA board.

For further information about the *Repeater to Repeater Link* feature, refer to the VD202 91/EN *R2R, Repeater to Repeater Link Kit, Installation Guide*.

Channel Selective GSM Repeater

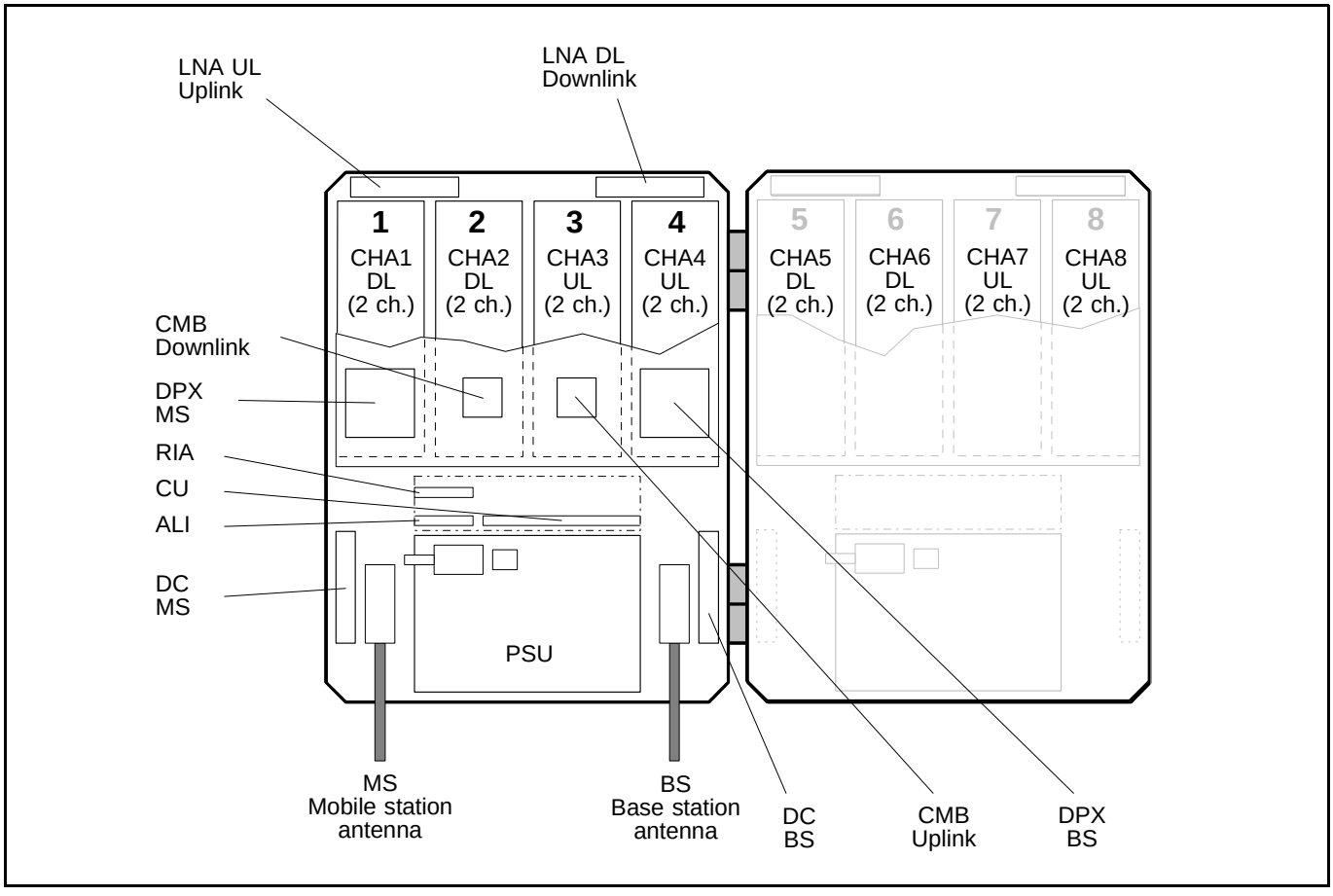


Figure 5-1. Channel selective GSM repeater

A cabinet (the left part in Figure 5-1) for a channel selective GSM repeater can be equipped with four CHA channel boards, two downlink boards (DL) with two internal channels each and two uplink boards (UL) with two internal channels each. The described cabinet has a capacity of four bi-directional GSM channels.

The cover (the right part in Figure 5-1) can be equipped as well, which gives up to eight GSM channels. The cover board positions are shown in the figure.

Channel selective GSM repeaters are used for GSM, DCS and PCS types of TDMA systems.

Main units:

ALI	Alarm Interface board
CHA	Channel Selective Amplifier board, GSM type
CMB	Combiner unit
CU	Control Unit board
DC	Directional Coupler
DPX	Duplex filter
LNA	Low Noise Amplifier
PSU	Power Supply Unit
RIA	Repeater to Repeater Interface Adapter (optional)

Channel Selective CDMA Repeater

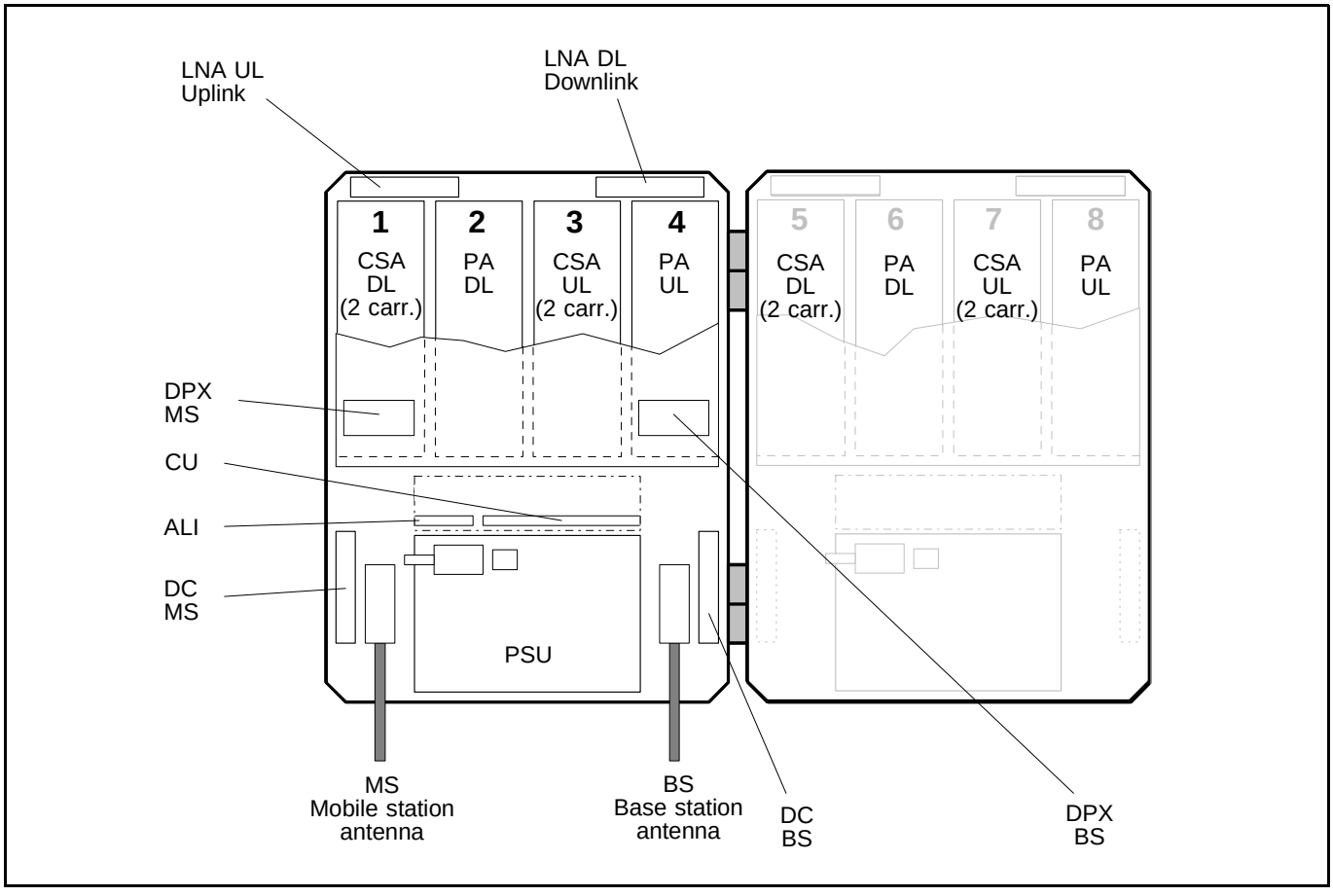


Figure 5-2. Channel selective CDMA repeater

A cabinet (the left part in Figure 5-2) for a channel selective CDMA repeater is equipped with two pair of CSA and PA boards, one pair for downlink (DL) and one pair for uplink (UL). The described cabinet has a capacity of two bi-directional CDMA carriers.

The cover (the right part in Figure 5-2) can be equipped as well. The cover board positions are shown in the figure.

CSA boards are used for IS-95 or J-STD-008 types of CDMA systems.

Main units:

ALI	Alarm Interface board
CSA	Channel Selective Amplifier board, CDMA type
CU	Control Unit board
DC	Directional Coupler
DPX	Duplex filter
LNA	Low Noise Amplifier
PA	Power Amplifier board
PSU	Power Supply Unit

Band Selective Repeater

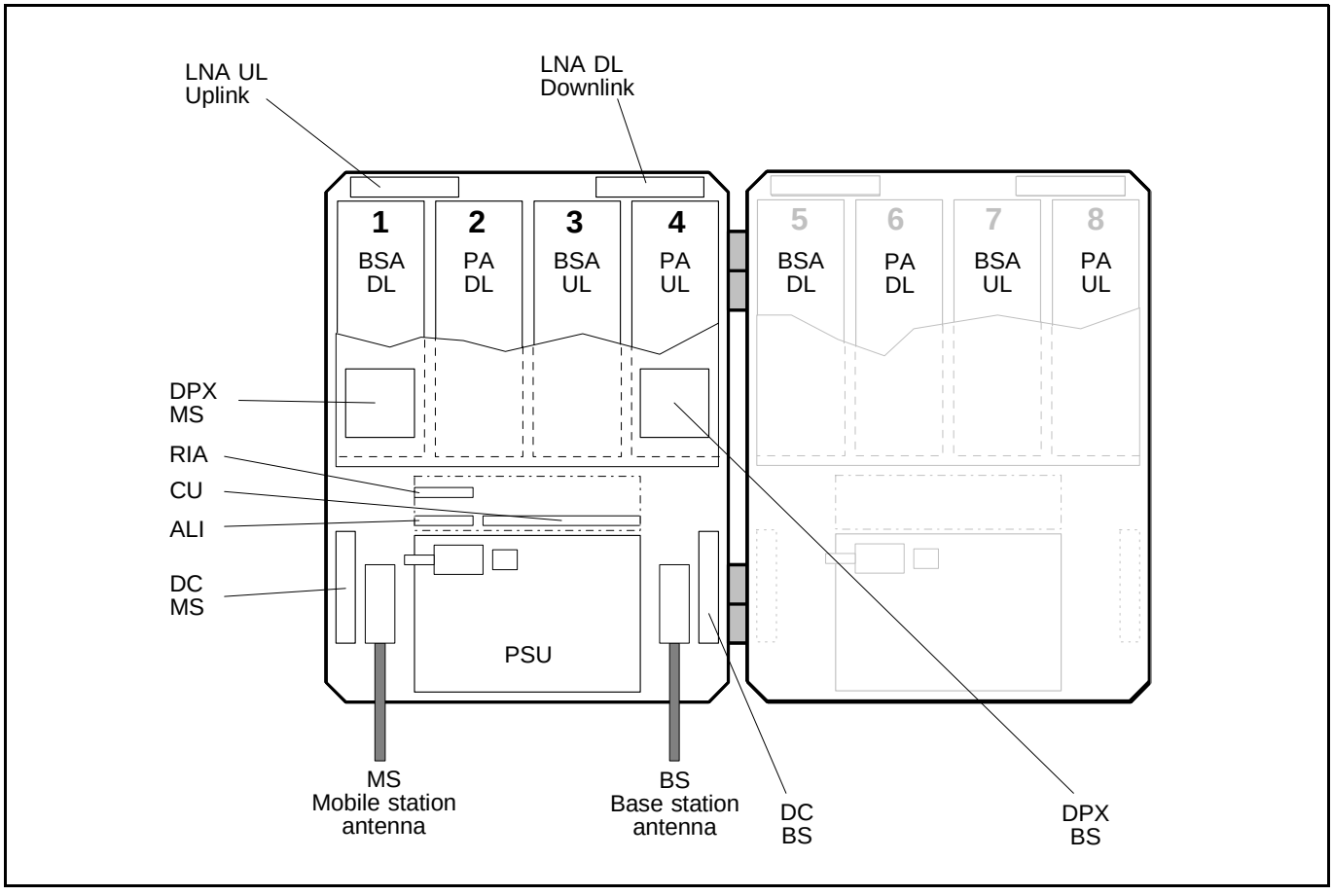


Figure 5-3. Band selective repeater

A cabinet (the left part in Figure 5-3) for a band selective repeater is equipped with two pair of BSA and PA boards, one pair for downlink (DL) and one pair for uplink (ULS). The described cabinet is equipped for bi-directional band selective operation.

The cover (the right part in Figure 5-3) can be equipped as well. The cover board positions are shown in the figure.

BSA boards are used for band selective systems either with a fixed band width of 900MHz or an adjustable band width.

Main units:

ALI	Alarm Interface board
BSA	Band Selective Amplifier board, fixed or adjustable band width
CU	Control Unit board
DC	Directional Coupler
DPX	Duplex filter
LNA	Low Noise Amplifier
PA	Power Amplifier board
PSU	Power Supply Unit
RIA	Repeater to Repeater Interface Adapter (optional)

Combined Repeater

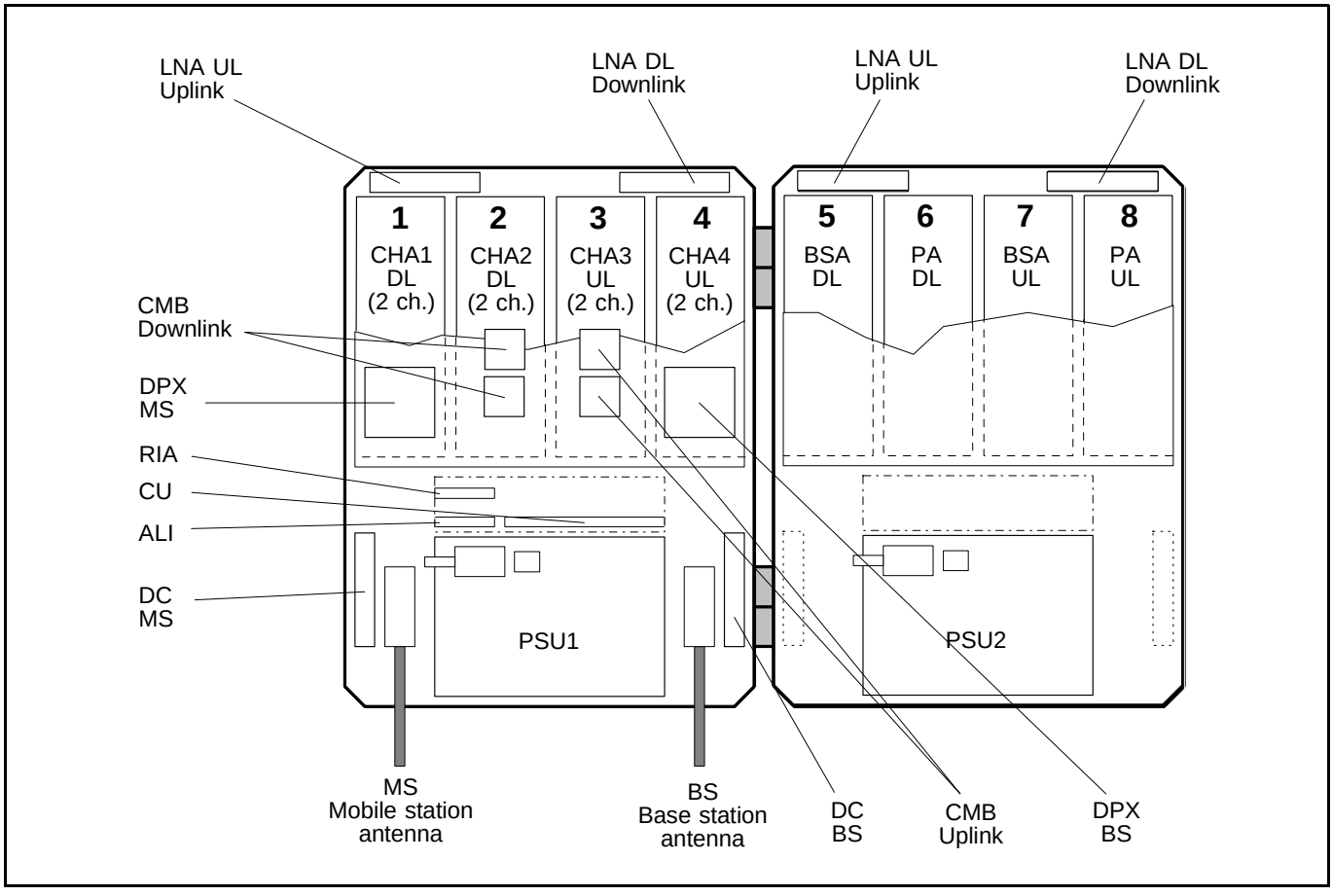


Figure 5-4. Combined repeater

Figure 5-4 shows an example of a combined channel selective and band selective repeater. The channel selective part is located in the cabinet and the band selective part in the cover.

This example has four bi-directional GSM channels and band selective operation.

Any combinations of channel selective GSM part (page 5-4), channel selective CDMA part (page 5-5) and band selective part (page 5-6) can be mixed.

Main units:

ALI	Alarm Interface board
BSA	Band Selective Amplifier board, fixed or adjustable band width
CHA	Channel Selective Amplifier board, GSM type
CMB	Combiner unit
CU	Control Unit board
DC	Directional Coupler
DPX	Duplex filter
LNA	Low Noise Amplifier
PA	Power Amplifier board
PSU1,2	Power Supply Unit 1 and 2
RIA	Repeater to Repeater Interface Adapter (optional)

Block Diagram

The following block diagrams are found in this section:

- Channel selective GSM repeater, Figure 5-5 on page 5-10.
- Channel selective CDMA repeater, Figure 5-6 on page 5-12.
- Band selective repeater, Figure 5-7 on page 5-14.

Some of the most important features and functions are described below.

The main signal paths for the repeater types are described under the block diagrams.

Downlink

The downlink signal path, i.e. from the base station through the repeater to the mobile station, is described for channel selective GSM operation, channel selective CDMA operation, and band selective operation under the block diagrams on the following pages.

Uplink

The uplink signal path, i.e. from the mobile station through the repeater to the base station, is identical to the downlink path the other way round. Only some levels and component values differ.

Repeater Setup

The repeater parameters can be set locally by means of a desktop or notebook loaded with the OMT32 software (or the OMS software). The PC or notebook is connected to the CU via the P31 serial RS-232 PC port (see Figure 5-5, Figure 5-6 and Figure 5-7).

The repeater parameters can also be set remotely by means of a phone (mobile or via a telephone line) and a modem connected to the CU board via the P32 modem serial RS-232 port (see Figure 5-5, Figure 5-6 and Figure 5-7).

Alarm

Alarm signals from external sensors are received by the ALI board, which forwards the alarm signals to the CU board.

The software on the CU board is able to activate acoustic or visual alarm or direct the alarm to the P33 alarm RS-232 port to be forwarded, via modem and telephone, to an OMT32/PC (or OMS/PC) located in an operation and maintenance central.

Alarms can be configured from an OMT32/PC (or from an OMS/PC).

Channel Selective GSM Repeater

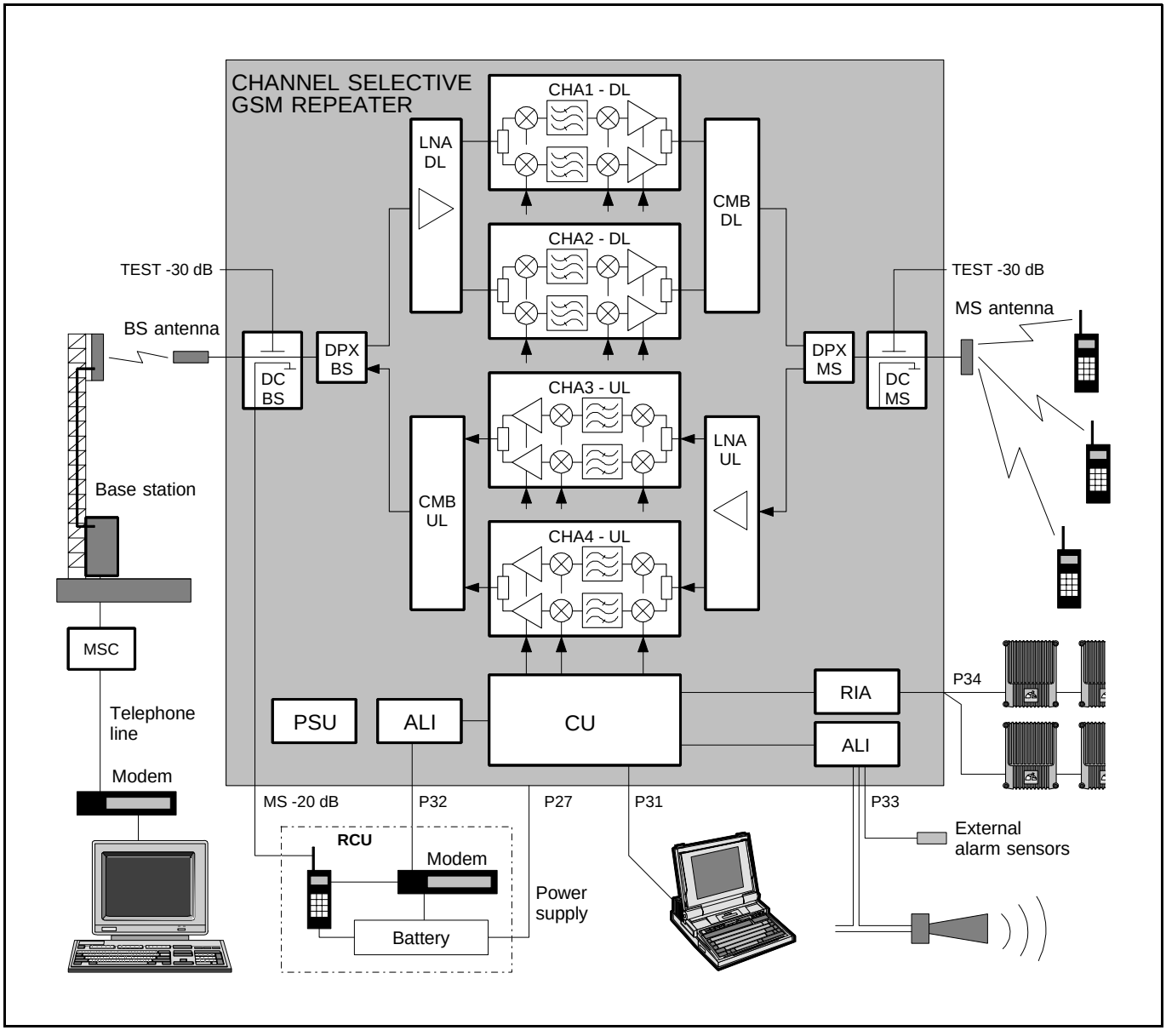


Figure 5-5. Block diagram, channel selective repeater

Figure 5-5 shows a block diagram of a channel selective repeater with four bi-directional channels. This diagram is applicable to repeaters for the GSM, DCS/PCN and GSM 1900 (PCS) systems.

Downlink

The signal from the base station is received via the repeater BS antenna and is then forwarded through a directional coupler (DC). The signal passes a duplex filter (DPX), is amplified in a low noise amplifier (LNA), and enters the channel boards (CHA), which have two parallel channels each.

The first mixer stage on the CHA amplifier board, which is controlled by a synthesizer, converts the received frequency down to the IF frequency. The signal is then filtered by a SAW bandpass filter and, not shown in the figure, amplified before it is fed to the second mixer stage, controlled by the same synthesizer as the previous one, for converting back to the original frequency.

The output signal from the mixer is then amplified in the power amplifier and fed to a combiner, which combines the signals from the two channels on the channel board.

The output signal passes a combiner (CMB), a duplex filter (DPX), and a directional coupler (DC), before it is fed to the repeater MS antenna.

Channel Selective CDMA Repeater

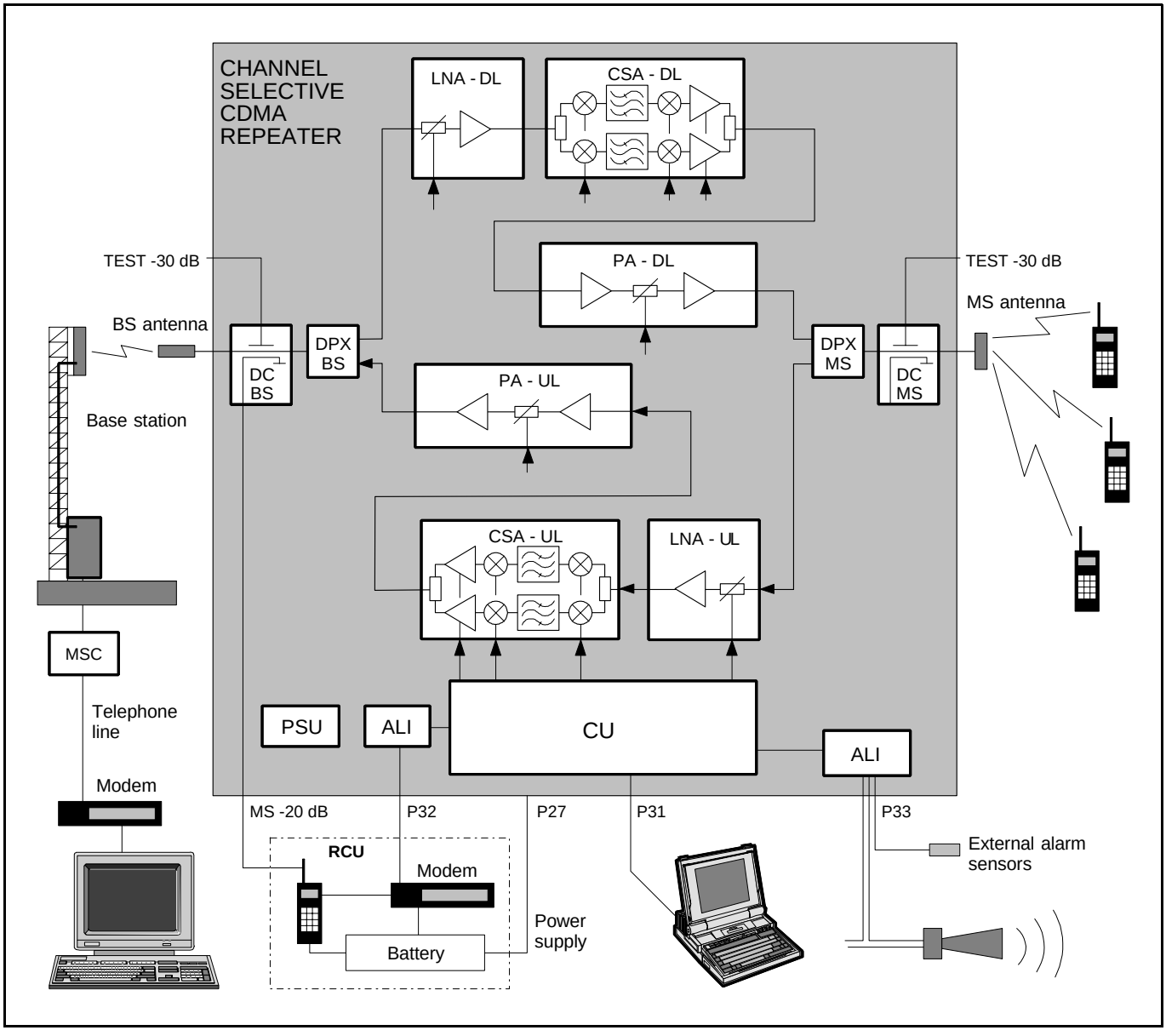


Figure 5-6. Block diagram, CDMA repeater

Figure 5-6 shows a block diagram of a channel selective CDMA repeater. This diagram is applicable only to repeaters for the CDMA system.

Downlink

The signal from the base station is received via the repeater BS antenna and is then forwarded through a directional coupler (DC). The signal passes a duplex filter (DPX), is amplified in a low noise amplifier (LNA), and enters the channel board (CSA), which has two parallel channels.

The first mixer stage on the CSA amplifier board, which is controlled by a synthesizer, converts the received frequency down to the IF frequency. The signal is then filtered by a SAW bandpass filter and, not shown in the figure, amplified before it is fed to the second mixer stage, controlled by the same synthesizer as the previous one, for converting back to the original frequency.

The following power amplifier is controlled by the CU. The output gain can be reduced to avoid instability due to poor antenna isolation.

The output signal from the amplifier is fed to a combiner, which combines the signals from the two channels on the channel board.

A detector on the PA board measures continuously the output level. The signal from this detector is used by the automatic gain control, AGC, to supervise and, if necessary, reduce the output power to keep it under a maximum level. The AGC gain control affects all the amplification stages.

The output signal passes a duplex filter (DPX) and a directional coupler (DC) before it is fed to the repeater MS antenna.

Band Selective Repeater

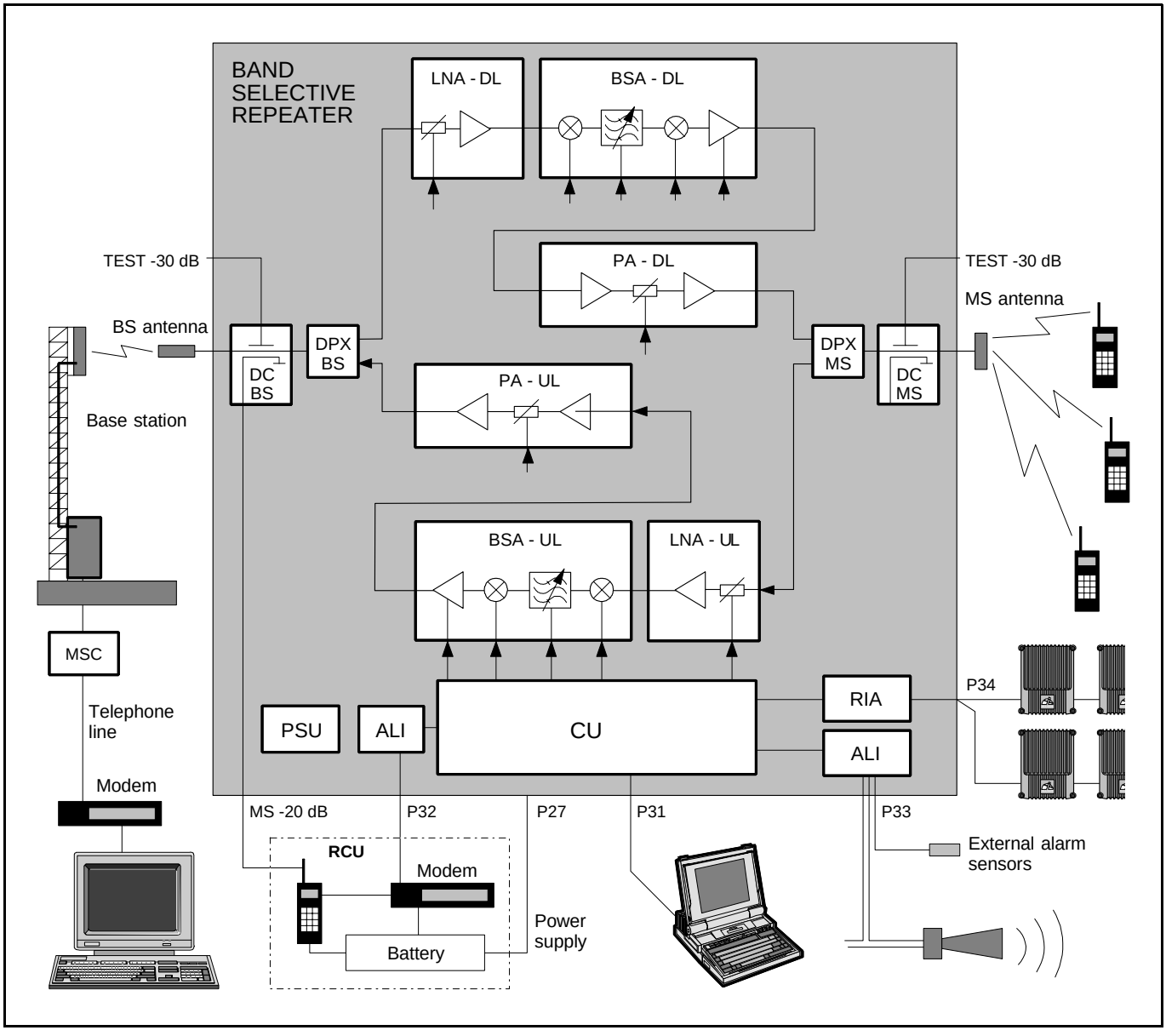


Figure 5-7. Block diagram, band selective repeater

Figure 5-7 shows a block diagram of a band selective repeater. This diagram is applicable to repeaters for e.g. NMT, TACS/ETACS and AMPS/DAMPS systems.

Downlink

The signal from the base station is received via the repeater BS antenna and is then forwarded through a directional coupler (DC). The signal passes a duplex filter (DPX), is amplified in a low noise amplifier (LNA), and enters the band selective amplifier board (BSA).

The first mixer stage on the BSA amplifier board, which is controlled by a synthesizer, converts the received frequency down to the IF frequency. The signal is then filtered by a SAW bandpass filter and, not shown in the figure, amplified before it is fed to the second mixer stage, controlled by the same synthesizer as the previous one, for converting back to the original frequency.

The SAW filter can be either fixed or adjustable depending on the BSA board used. If the BSA board has fixed band width, this SAW filter is fixed and selected for the current band width. If the BSA board has adjustable band width, the SAW filter can be software changed from within OMT32 (or OMS) to cover various band widths.

The following power amplifier is controlled by the CU. The output gain can be reduced to avoid instability due to poor antenna isolation.

A detector on the PA board measures continuously the output level. The signal from this detector is used by the automatic gain control, AGC, to supervise and, if necessary, reduce the output power to keep it under a maximum level. The AGC gain control affects all the amplification stages.

The output signal passes duplex filter (DPX) and a directional coupler (DC) before it is fed to the repeater MS antenna.

Board and Unit Descriptions

Cabling between boards and units is found on page 5-26.

DC - Directional Coupler

The directional couplers on the BS and MS sides are identical.

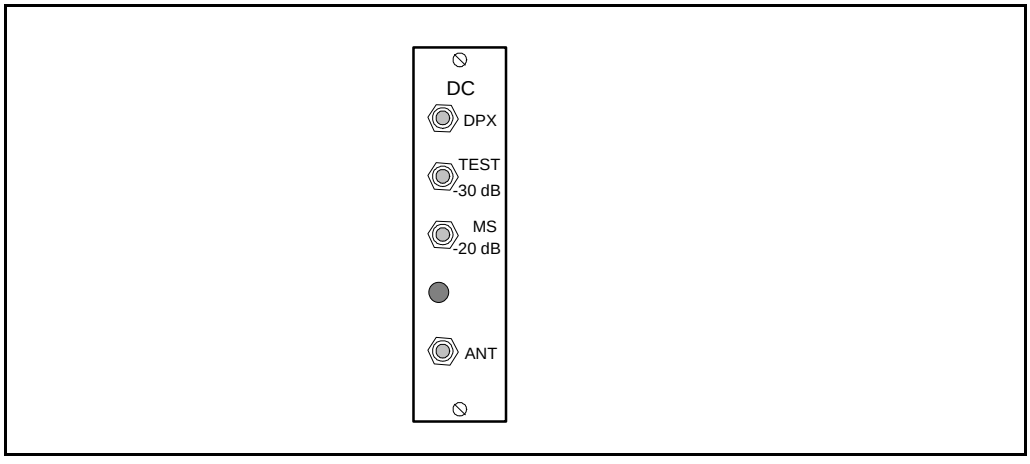


Figure 5-8. DC Directional coupler

Connection

To the left in the cabinet DC/MS:

Port	Connected to
DPX	ANT on the DPX/MS duplex filter.
TEST –30dB	Test port for the downlink output signal. This port has no directivity.
MS –20dB	Not used.
ANT	MS antenna.

To the right in the cabinet DC/BS:

Port	Connected to
DPX	ANT on the DPX/BS duplex filter.
TEST –30dB	Test port for the uplink output signal. This port has no directivity.
MS –20dB	Mobile station antenna connection for remote control. This port has at least 20dB directivity towards the antenna.
ANT	BS antenna.

DPX - Duplex Filter

The DPX duplex filters on the BS and MS sides are identical.

Connection

To the left in the cabinet DPX/MS:

Port	Connected to
ANT	DPX on the DC/MS directional coupler.
HI	*Channel selective GSM repeater:* Output on the CMB/DL combiner (at 4 channels), P701 on the CHA1/DL channel board (at 2 channels). *Channel selective CDMA repeater:* P5 on the PA/DL board. *Band selective repeater:* P5 on the PA/DL board.
LO	IN on the LNA/UL low noise amplifier.

To the right in the cabinet DPX/BS:

Port	Connected to
ANT	DPX on the DC/BS directional coupler.
HI	IN on the LNA/DL low noise amplifier.
LO	*Channel selective GSM repeater:* Output on the CMB/UL combiner (at 4 channels), P701 on the CHA3/UL channel board (at 2 channels) *Channel selective CDMA repeater:* P5 on the PA/UL board. *Band selective repeater:* P5 on the PA/UL board.

LNA - Low Noise Amplifier

The LNA low noise amplifiers are located in the outermost boxes at the top of the cabinet and large cover (see Figure 5-1 to Figure 5-4 on page 5-4 to 5-7). LNA/UL (uplink) is located to the left and LNA/DL (downlink) to the right. All coaxial connectors are SMA type.

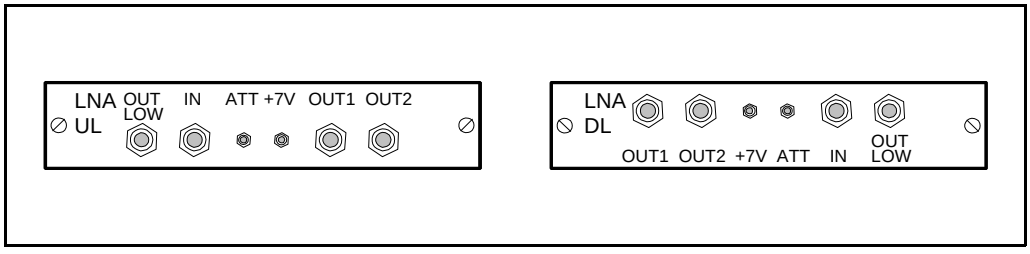


Figure 5-9. LNA low noise amplifier

Signals from the duplex filter output is fed to the LNA input connector IN. Output OUT1 and OUT2 feed the CHA boards of the same signal direction. The signal level in these connectors are +20dB referred to the antenna input. Another output, OUT LOW, is an expansion output for an additional LNA amplifier, if the repeater is equipped in the cover part of the chassis. The gain to this connector is +2dB.

The +7V input is used for 7V supply from the DIA board.

ATT is a control signal for a controllable attenuator in the LNA.

Connection

To the left in the cabinet LNA/UL:

Port	Connected to
OUT LOW	IN on the LNA/UL in the cover if equipped.
IN	LO on the DPX/MS duplex filter.
ATT	P23 on the DIA board.
+7V	P23 on the DIA board.
OUT1	P101 on the CHA3/UL or CSA/UL or BSA/UL board.
OUT2	P101 on the CHA4/UL channel board.

To the right in the cabinet LNA/DL:

Port	Connected to
OUT LOW	IN on the LNA/DL in the cover if equipped.
IN	HI on the DPX/BS duplex filter.
ATT	P24 on the DIA board.
+7V	P24 on the DIA board.
OUT1	P101 on the CHA1/DL or CSA/DL, or BSA/DL board.
OUT2	P101 on the CHA2/DL channel board.

Not used outputs do not need to be terminated.

CHA - Channel Amplifier Board for Channel Selective Operation

The cabinet can be equipped with four CHA Channel Amplifier boards. These are numbered from left to right: CHA1 - CHA4. The board positions CHA1 - CHA2 are used for downlink and CHA3 - CHA4 for uplink (see Figure 5-1 on page 5-4). If the repeater is equipped with two channels only, the board positions 1 and 3 are used.

The two internal channels on each CHA board are located to the left and to the right on the board.

If a board is to be removed, the RFI filter at the board connector and the two coaxial connectors must be removed prior to the board removal. No heat compound is used on the heat sink body or on the chassis.

Coaxial connector P101 is the input of the CHA board fed from the LNA.

Coaxial connector P701 is the output of the board. The output signal is fed to the duplex filter, either directly or via a CMB combiner, depending on the repeater configuration.

Connection

Board #1 from the left CHA1/DL:

Port	Connected to
P101	OUT1 on the LNA/DL low noise amplifier.
P701	Input on the CMB/DL combiner (at 4 channels) or HI on the DPX/MS duplex filter (at 2 channels).

Board #2 from the left CHA2/DL:

Port	Connected to
P101	OUT2 on the LNA/DL low noise amplifier.
P701	Input on the CMB/DL combiner.

Board #3 from the left CHA3/UL:

Port	Connected to
P101	OUT1 on the LNA/UL low noise amplifier.
P701	Input on the CMB/UL combiner (at 4 channels) or LO on the DPX/BS duplex filter (at 2 channels).

Board #4 from the left CHA4/UL:

Port	Connected to
P101	OUT2 on the LNA/UL low noise amplifier.
P701	Input on the CMB/UL combiner.

Caution

BERYLLIUM OXIDE

The CHA Channel Amplifier board power transistors contain beryllium oxide (BeO) that is poisonous. The power transistors are mounted with two screws as opposed to other transistors. See Chapter 1, *Safety.*

CSA and PA Boards for Channel Selective CDMA Operation

For channel selective CDMA operation, the cabinet is normally equipped with two CSA and two PA boards. These are numbered from left to right. Board position 1 is used for CSA downlink board, position 2 for PA downlink board, position 3 for CSA uplink board, and position 4 for PA uplink board (see Figure 5-2 on page 5-5).

If a board is to be removed, the RFI filter at the board connector, the two coaxial connectors, and the flat conductor cable between the CSA board and the PA board must be removed prior to the board removal. No heat compound is used on the heat sink body or on the chassis.

Coaxial connector P101 is the input of the CSA board fed from the LNA.

Coaxial connector P301 is the output of the CSA board. The signal from this output is fed to the PA board input P4. The PA board output P5 is fed to the duplex filter of the same signal direction.

Connection

Board #1 from left CSA/DL:

Port	Connected to
P101	OUT1 on the LNA/DL low noise amplifier.
P301	P4 on the PA/DL board.

Board #2 from left PA/DL:

Port	Connected to
P4	P301 on the CSA/DL board.
P5	HI on the DPX/MS duplex filter.

Board #3 from left CSA/UL:

Port	Connected to
P101	OUT1 on the LNA/UL low noise amplifier.
P301	P4 on the PA/UL board.

Board #4 from left PA/UL:

Port	Connected to
P4	P301 on the CSA/UL board.
P5	LO on the DPX/BS duplex filter.

Caution

BERYLLIUM OXIDE

The PA Power Amplifier board power transistors contain beryllium oxide (BeO) that is poisonous. The power transistors are mounted with two screws as opposed to other transistors. See Chapter 1, *Safety.*

BSA and PA Boards for Band Selective Operation

For band selective operation, the cabinet is equipped with two BSA and two PA boards. These are numbered from left to right. Board position 1 is used for BSA downlink board, position 2 for PA downlink board, position 3 for BSA uplink board, and position 4 for PA downlink board (see Figure 5-3 on page 5-6).

If a board is to be removed, the RFI filter at the board connector, the two coaxial connectors, and the flat conductor cable between the BSA board and the PA board must be removed prior to the board removal. No heat compound is used on the heat sink body or on the chassis.

Coaxial connector P101 is the input of the BSA board fed from the LNA.

Coaxial connector P301 is the output of the BSA board. The signal from this output is fed to the PA board input P4. The PA board output P5 is fed to the duplex filter of the same signal direction.

Connection

Board #1 from left BSA/DL:

Port	Connected to
P101	OUT1 on the LNA/DL low noise amplifier.
P301	P4 on the PA/DL board.

Board #2 from left PA/DL:

Port	Connected to
P4	P301 on the BSA/DL board.
P5	HI on the DPX/MS duplex filter.

Board #3 from left BSA/UL:

Port	Connected to
P101	OUT1 on the LNA/UL low noise amplifier.
P301	P4 on the PA/UL board.

Board #4 from left PA/UL:

Port	Connected to
P4	P301 on the BSA/UL board.
P5	LO on the DPX/BS duplex filter.

Caution

BERYLLIUM OXIDE

The PA Power Amplifier board power transistors contain beryllium oxide (BeO) that is poisonous. The power transistors are mounted with two screws as opposed to other transistors. See Chapter 1, *Safety*.

DIA Board

DIA is a distribution board for most of the boards, units and ports. The DIA board is exclusively equipped with connectors. The connector types are chosen to prevent unintentional mixing up.

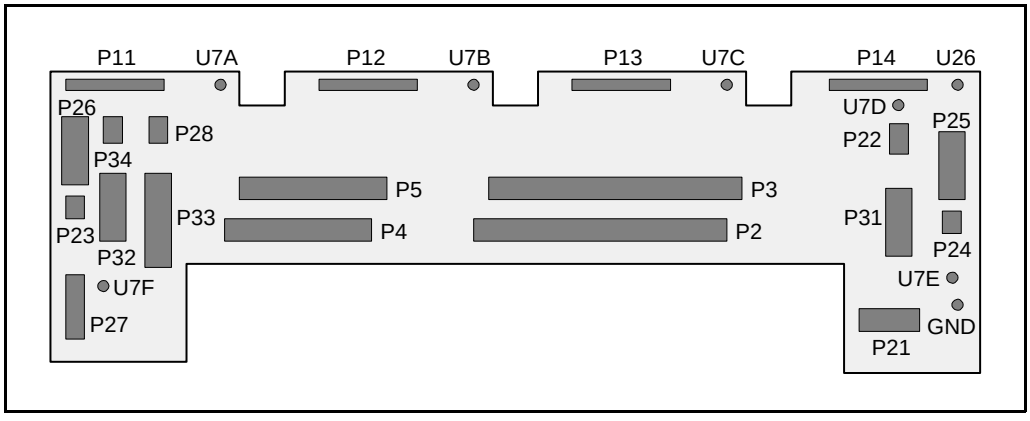


Figure 5-10. DIA board connectors and testpoints

Connection and connector types

Port	Connected to	Connector type
P2	CU board	
P3	Not used	
P4	ALI board	
P5	Not used	
P11	CHA1/DL or CSA/DL or BSA/DL	16 pole 1 line female
P12	CHA2/DL or PA/DL	16 pole 1 line female
P13	CHA3/UL or CSA/UL or BSA/UL	16 pole 1 line female
P14	CHA4/UL or PA/UL	16 pole 1 line female
P21	PSU - Power Supply Unit	10 pole 2 line male
P22	LED board in the cover	4 pole 1 line male
P23	LNA/UL	2 pole 1 line male
P24	LNA/DL	2 pole 1 line male
P25	Expansion output port to cover circuitry if any. Only in cabinets.	16 pole 2 line male
P26	Expansion input port from the cabinet. Used in equipped large covers only.	16 pole 2 line male
*P27	AUX1 auxiliary connector	8 pole 1 line male
P28	Door switch (internal alarm)	3 pole 1 line male
P31	PC (serial RS-232)	9 pole D-sub female
P32	Modem (serial RS-232)	9 pole D-sub male
P33	External alarm	15 pole D-sub female
P34	Repeater to Repeater Link	8 pole RJ45 modular female

*Pin 2 and 3 on the P27 connector must be interconnected with a jumper if the connector is not used.

Testpoints

Testpoint	Voltage	Purpose
U7A	+7V DC	CHA1/DL or CSA/DL or BSA/DL downlink board supply voltage.
U7B	+7V DC	CHA2/DL or PA/DL downlink board supply voltage.
U7C	+7V DC	CHA3/UL or CSA/UL or BSA/UL downlink board supply voltage.
U7D	+7V DC	CHA4/UL or PA/UL downlink board supply voltage.
U7E	+7V DC	LNA/UL and LNA/DL and P27 auxiliary port supply voltage.
U7F	+7V DC	CU board and ALI board and RCU supply voltage via the P27 auxiliary port jumper.
U26	+26V DC or +10V DC	Power amplifiers and P27 auxiliary port supply voltage (26V or 10V depending on the repeater type).
GND	0	Ground

DIA board part # and version

The DIA board part # is K105/1. Version R2A (containing the P34 connector) is required to use the optional *Repeater to Repeater Link* feature.

CU Control Unit Board

The CU board is the central board in the repeater, located in the repeater cabinet. The CU board contains a microprocessor, main memory, flash memory for the CU software, EEPROM memory for parameters, memory for the event log and statistics, a REFO reference oscillator, ports for local and remote communication, battery powered real-time clock, etc.

The CU board is used to supervise and control operational parameters such as gain control, channel handling, etc. The CU takes care of alarms and the event log, password and logon, and many other procedures.

The CU is also a control interface when using an OMT32/PC or an OMS/PC locally or remotely via modem.

The CU software can be downloaded from an OMT32/PC or OMS/PC either locally or remotely via modem.

The real-time clock on the CU board is used for alarm and for the event log.

There are currently two CU board variants: K103/1 and K103/2.

CU board and CU software part #s

K103/1 CU board (old)

CU board K103/1 can be run with the SA102 01/2 CU software. This board can store one version of CU software. The repeater will always boot on this software version.

K103/2 CU board (current)

CU board K103/2 can be run with either the old SA102 01/2 CU software or the current SA102 02/1 or SA102 02/2 CU software. This board can store two versions of CU software, located in segment 1 and segment 2 of the flash memory as *Application 1* and *Application 2*. The repeater will boot on that software which is set as *Primary* (description of *Primary* application is found in the *CU Revision Manager* section in Chapter 10).

Compatibility for CU boards and CU software is detailed in the next section.

Connection

The CU board is connected to the DIA board via the P2 port.

Caution

A lithium battery is permanently mounted on the CU board. Due to the risk of explosion, this battery must not be removed from the board. In case of battery malfunction, replace the CU board. The old CU board can be sent to Allgon for repair.

Repeater CU Software and Hardware Compatibility

There are different versions of repeater CU software, which can be combined with boards of various revisions. These have, however, unique part numbers and revision information. Below, you will find a table of repeater software currently available in combination with CU board revisions.

CU Software Part #	**Latest Software Revision**	**Compatible with CU board**	**Comments**
SA102 01/2	R2E	K103/1 or K103/2	For GSM channel selective ≤ 4 channels, band selective 800-900MHz fixed band width only, and combi (800/900MHz). No traffic statistics.
SA102 02/1	R3A	K103/2	For GSM, EGSM, DCS, PCS channel selective ≤ 8 channels, band selective 800-900MHz fixed or adjustable band width, band selective 1800MHz or 1900MHz and combi. Supports R2R link.
SA102 02/2	R1B*	K103/2	For 800/1900MHz CDMA ≤ 2 channels.

*R1B available August 1999 (800MHz CDMA added)

This information is updated 1999-07-01. As new versions of hardware and software are released without prior noticing, contact your Allgon sales representative if in doubt about the latest revision status.

For detailed information, refer to the release notes for the CU software to be downloaded (normally found in the *readme.txt* file, which is supplied with the program files).

Cabling

On the following pages, you will find cabling information for the various repeater types:

- Channel selective GSM repeater, 2 channels (page 5-27)
- Channel selective GSM repeater, 4 channels (page 5-28)
- Channel selective CDMA repeater (page 5-29)
- Band selective repeater (page 5-30)

Channel Selective GSM Repeater, 2 Channels

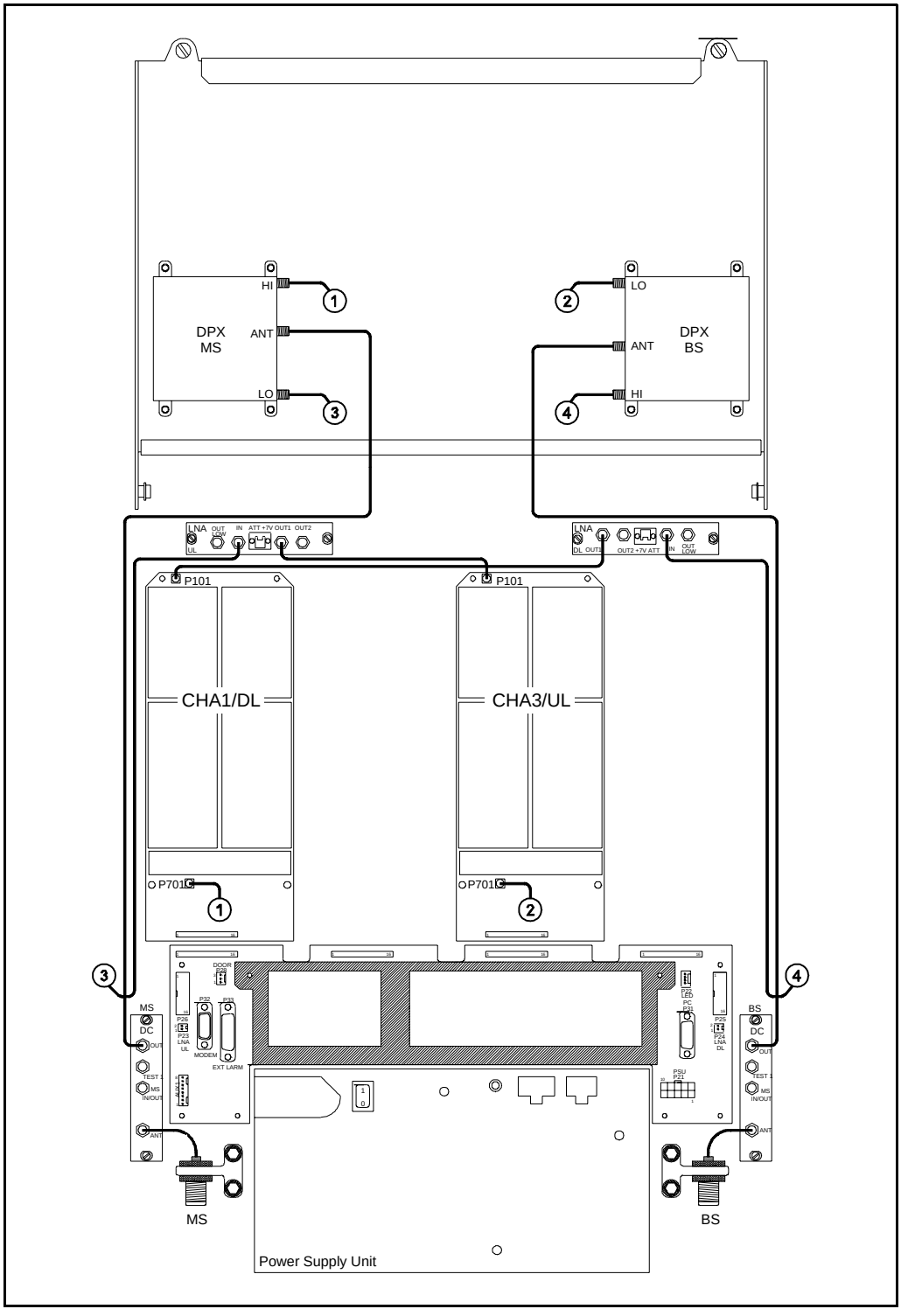


Figure 5-11. Cabling, GSM repeater - 2 channels

Figure 5-11 shows a repeater equipped with the two channel boards CHA1/DL and CHA3/UL for two bi-directional GSM channels.

Channel Selective GSM Repeater, 4 Channels

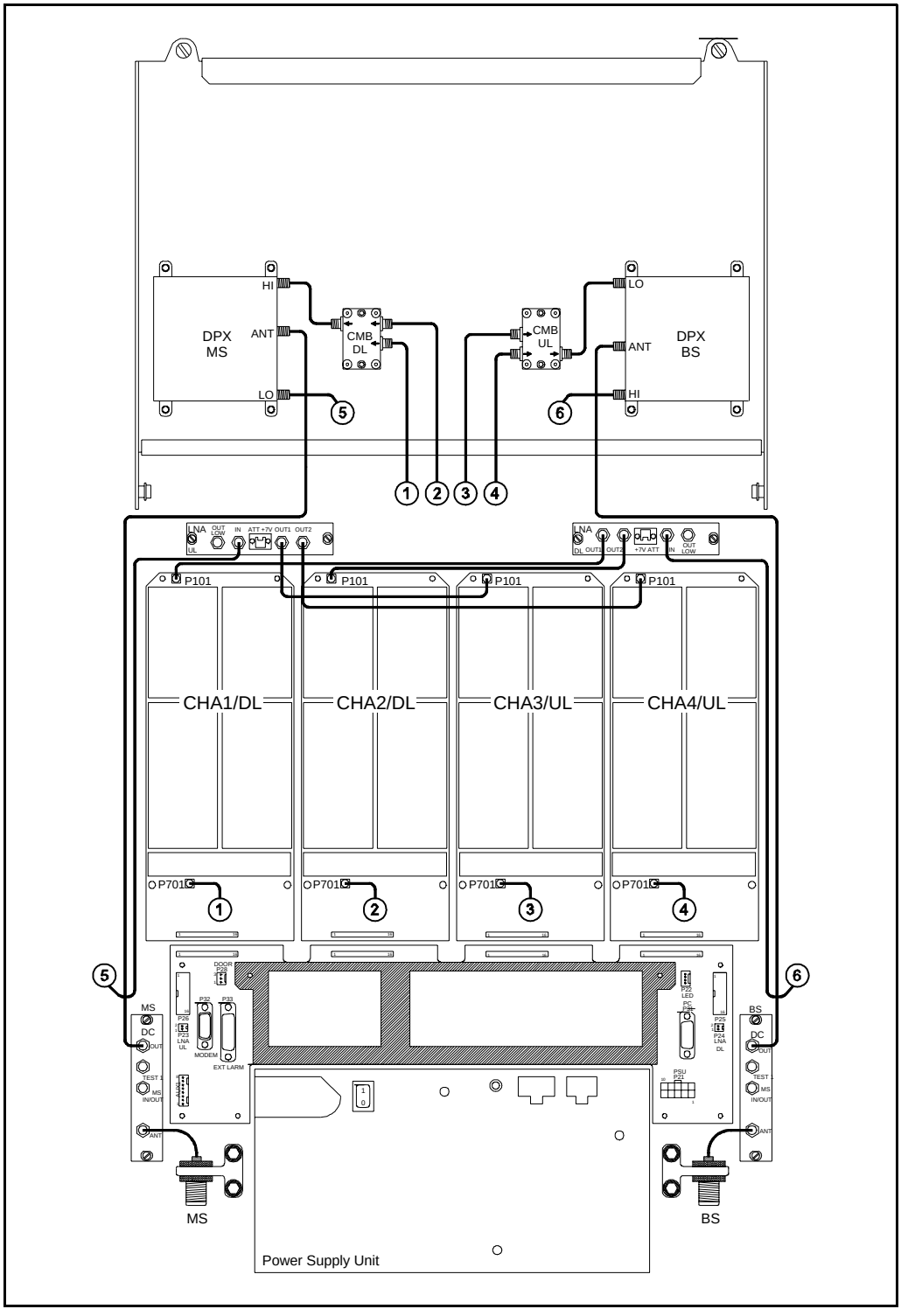


Figure 5-12. Cabling, GSM repeater - 4 channels

Figure 5-12 shows a channel selective repeater equipped with the channel boards CHA1/DL, CHA2/DL, CHA3/UL, and CHA4/UL for four bi-directional GSM channels.

Channel Selective CDMA Repeater

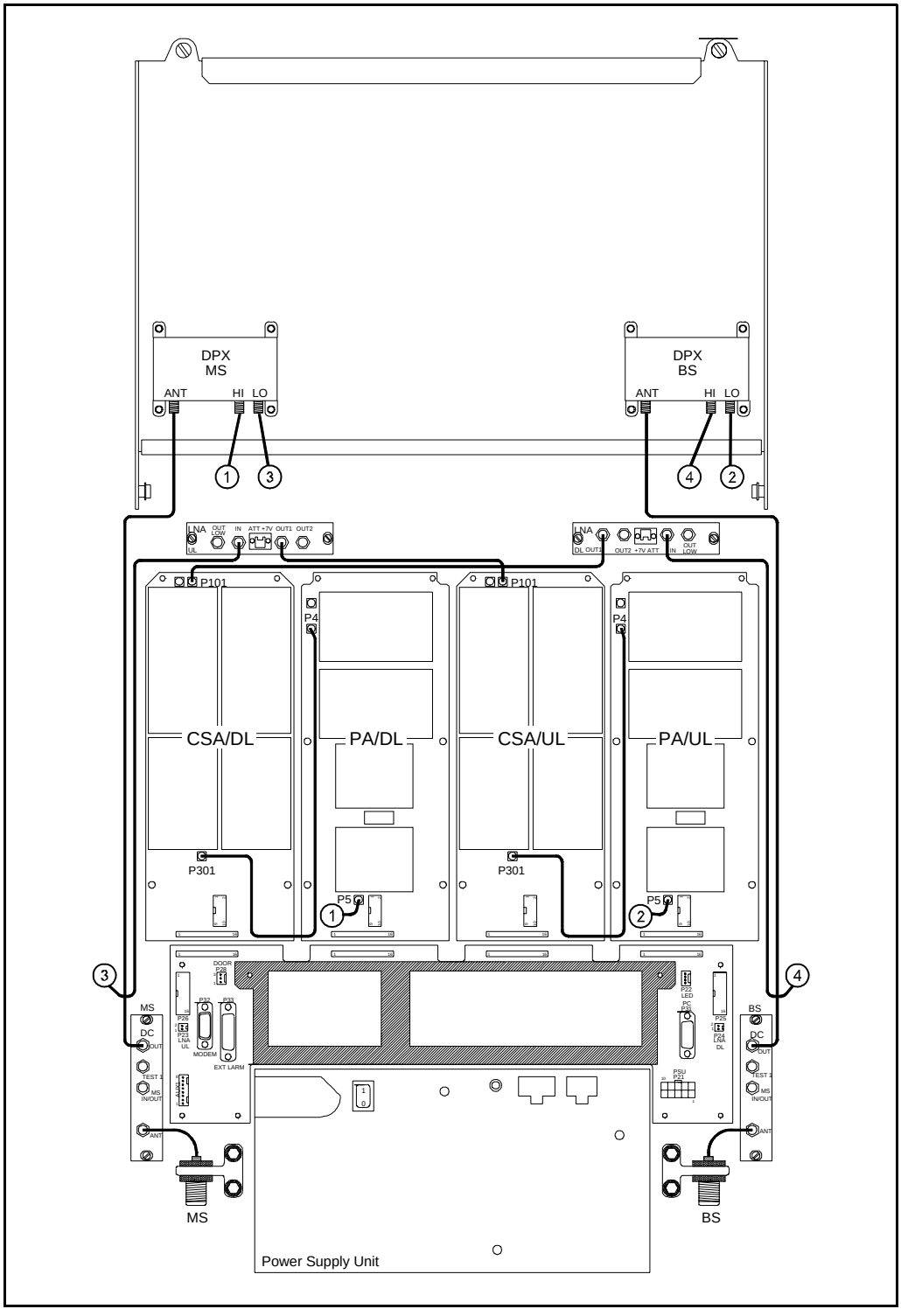


Figure 5-13. Cabling, CDMA repeater - 2 channels

Figure 5-13 shows a channel selective CDMA repeater equipped with two CSA boards and two PA boards.

Band Selective Repeater

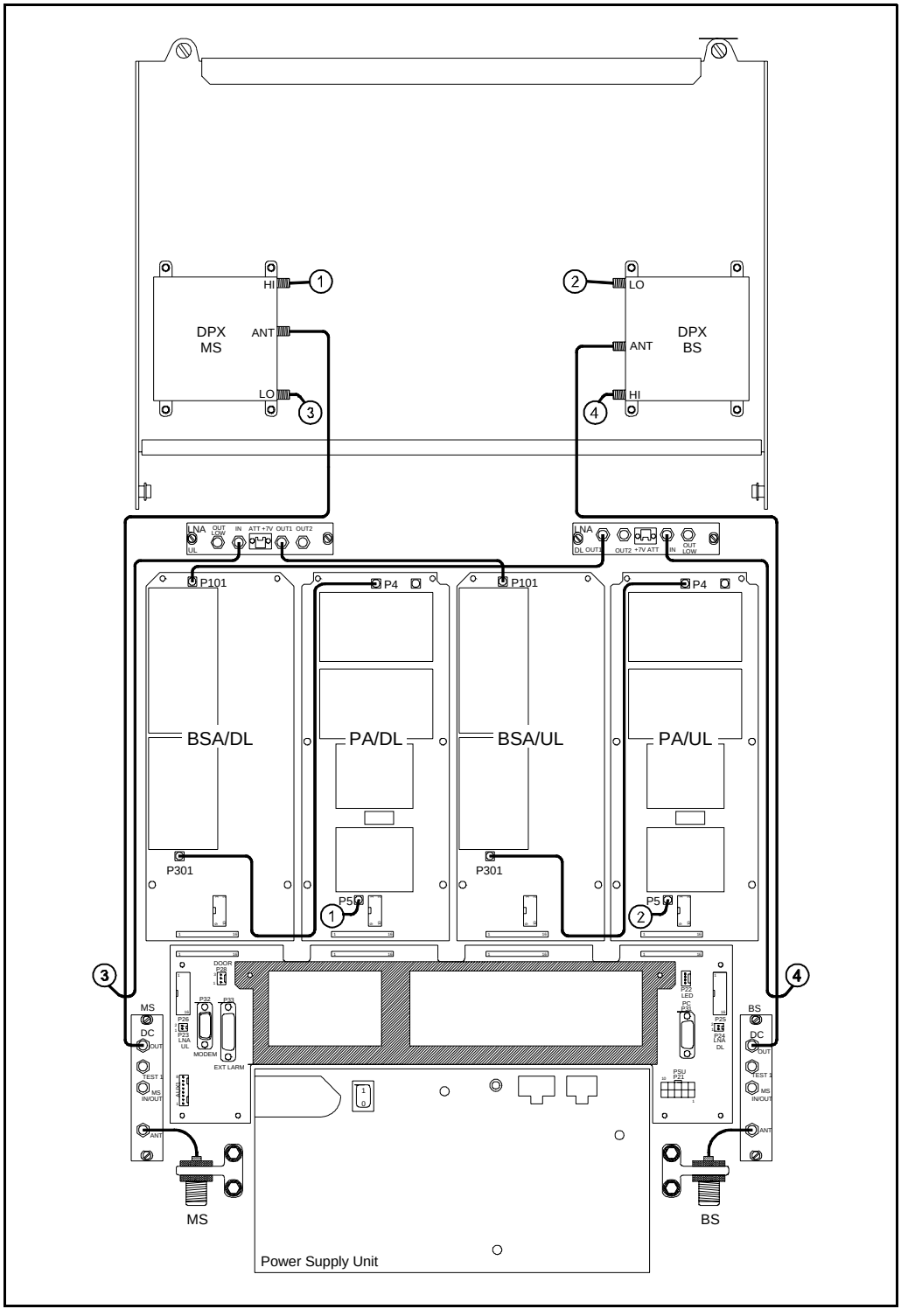


Figure 5-14. Cabling, band selective repeater

Figure 5-14 shows a band selective repeater equipped with two BSA boards and two PA boards.

Part 2 – Software

Part two of this manual describes the OMT32, i.e. the software.

Part two starts from Chapter 6, *OMT32 Installation*.

The hardware is described in part one of the manual, from Chapter 1 through Chapter 5.

6. OMT32 Installation

The OMT32 (Operation and Maintenance Terminal) is used to set up and supervise Allgon repeaters, either locally using a desktop or notebook connected to the repeater, or remotely via a traditional telephone line or a cellular phone.

All Allgon AR repeaters can be controlled by using the OMT32 software. OMT32 can, however, only take full advantage of repeaters equipped with the latest CU software (SA102 02/1 or SA102 02/2).

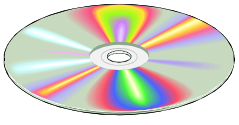
In this chapter, you will find the requirements for the desktop and how to install the OMT32 software.

Also, you will find information about automatic OMT32 start and recovery, log file, screen savers, and how to remove OMT32 from the system.

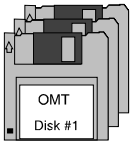
Requirements

The system requirements for OMT32:

- 100MHz Intel Pentium processor
- 32MB RAM
- 32MB free hard disk space
- Monitor with a minimum resolution of 800 by 600 pixels
- A free serial COM port
- A Hayes compatible modem
- Windows 95/98 or Windows NT 4.0 with Service Pack 3 or later. The latest service pack can be downloaded from *www.microsoft.com*.



The OMT32 software is available on a CD-ROM.



If you prefer to install the software from 3.5" disks, then copy the contents of the CD-ROM to disks. There are folders called DISK1, DISK2, etc. on the CD-ROM which are intended to be copied to 1.44MB disks.

Software Installation

1. Start Windows. If you install OMT32 under Windows NT 4.0, you must log on with privileges to change the system registry, normally as Administrator.

2. Make sure that no applications except Windows is running.

3. Insert the OMT32 disc in the CD-ROM drive (or disk 1 in the disk drive if you prefer to install by using copied disks).

4. If the install program does not start automatically, select **Run** in the **Start** menu and type on the command line:

   X:\setup (substitute the drive letter used for X).

   Or, you can click ▼ or the *Browse* button and select the *setup.exe* file.

   When ready, click the **OK** button.

5. In the *Welcome* dialog box, click the **Next>** button to proceed.

6. In the *User Information* dialog box, type your name and your company name and click the **Next>** button.

7. In the *Choose Destination Location* dialog box, set the path for the program folder. If you click the **Browse** button, you can choose an existing folder.

   When ready, click the **Next>** button.

8. In the *Setup Type* dialog box, select *Typical*, *Compact* or *Custom* installation. *Typical* installation is recommended. *Custom* lets you choose components to be installed. You can also change the path for the program folder in this dialog box.

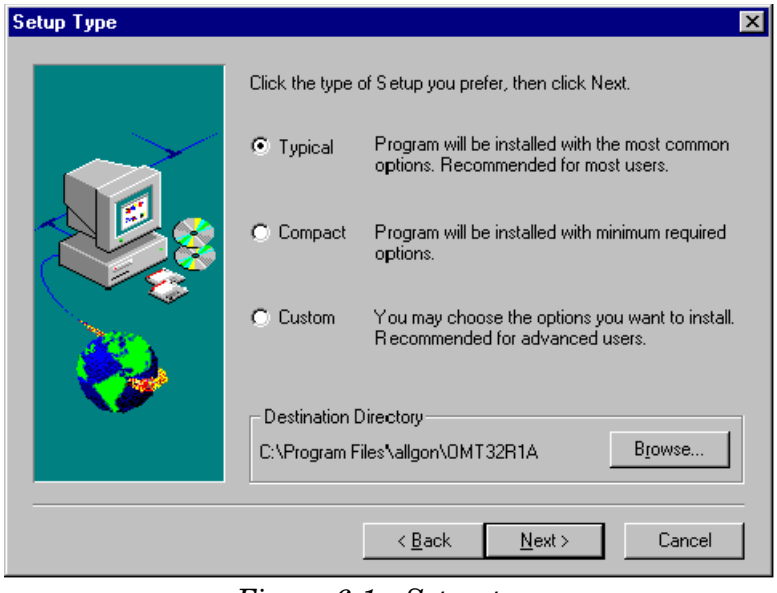


Figure 6-1. Setup type

When ready, click the **Next>** button.

9. In the *Select Program Folder* dialog box, choose the folder for the OMT32 start icon to be placed in. A default folder is suggested.

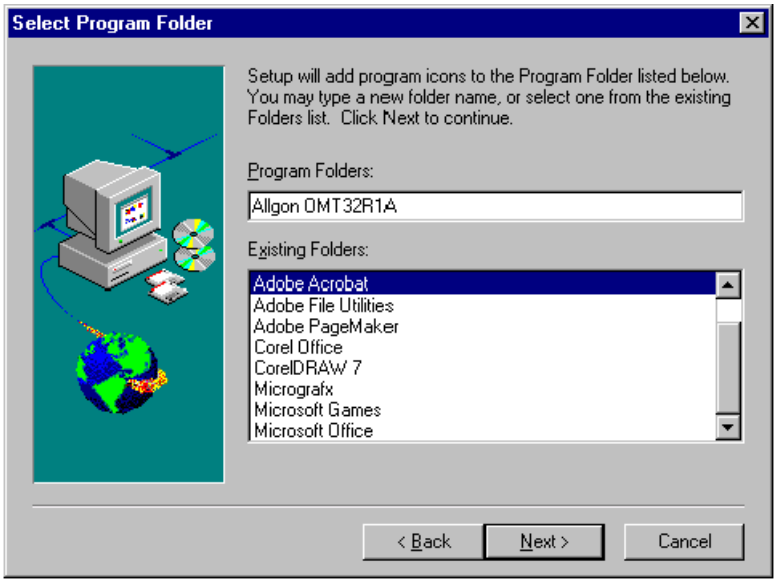


Figure 6-3. Program folder

If you want OMT to start automatically, choose the *Startup* folder.

When ready, click the **Next>** button.

10. In the *Start Copying Files* dialog box, check if the entered information is correct.

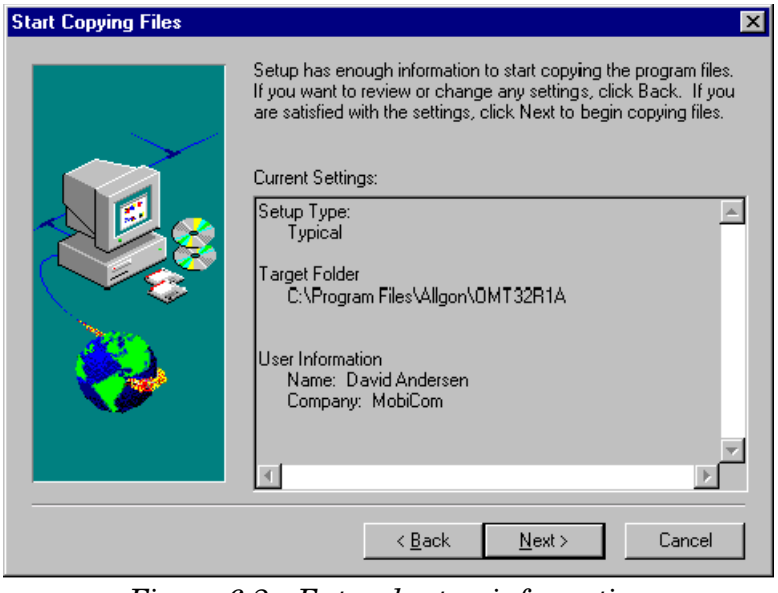


Figure 6-2. Entered setup information

You can change the information by clicking the **<Back** button.

When the information is correct, click the **Next>** button.

The OMT32 software is now installed on the computer.

11. Enter your company and user name in the *OMT Basic Parameters* dialog box.

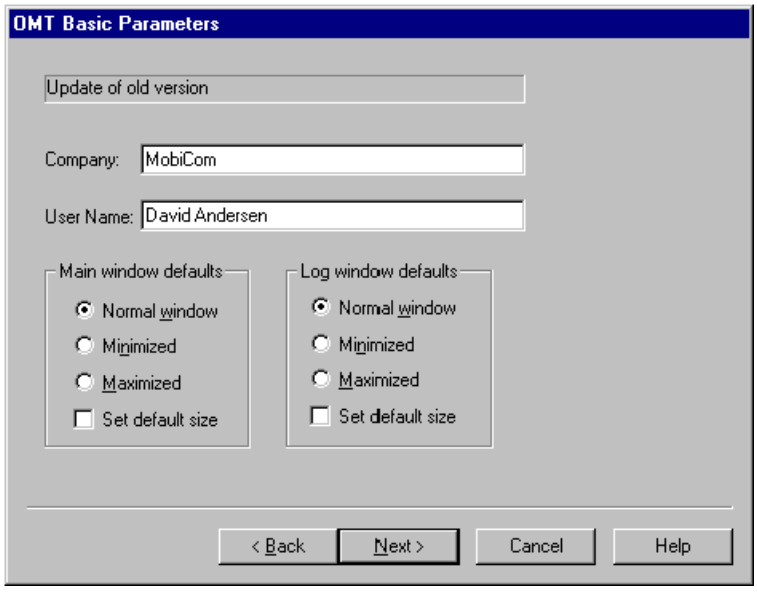


Figure 6-4. OMT32 basic parameters

Use the <Tab> key or mouse to move between the fields.

The OMT32 main window and the log window default size can be set as detailed below. This setting can be changed later.

Normal window means customized window size. If you move or resize the window, then the new setting remains until you use the **Set default size** option.

Minimized means iconized window (see the figure). To open a minimized window, click the iconized program.

Maximized means full screen window size.

Set default size sets the main window to standard position and size.

When ready, click the **Next>** button.

12. In the *OMT Communication Parameters* dialog box, set the communication parameters for the OMT32.

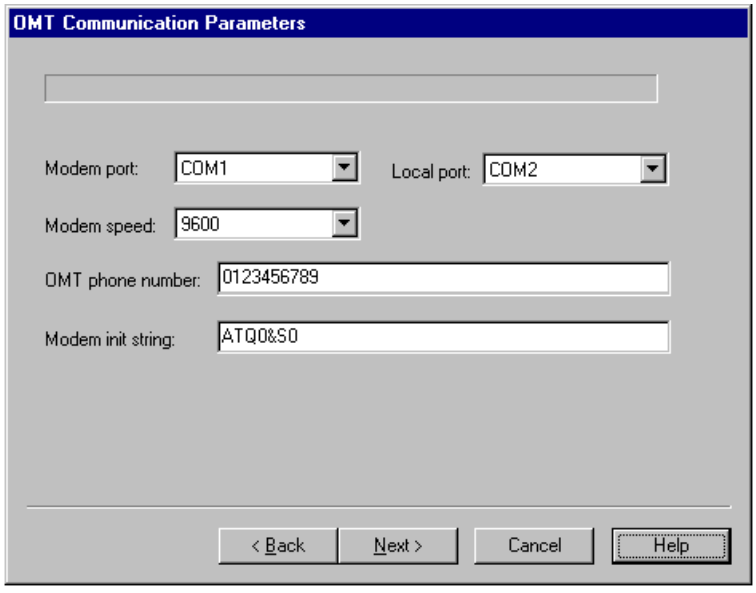
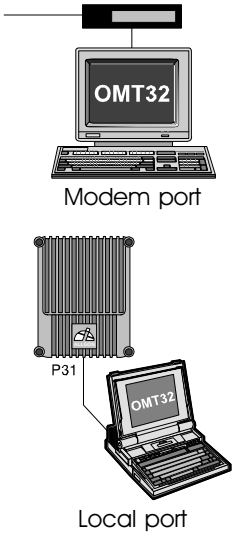


Figure 6-5. Communication parameters



The below communication parameters are to be set. Note that all these parameters can be changed later.

Select **Modem port**, i.e. the serial PC port which is intended to be connected to the modem at remote control (see the figure).

Select **Local port**, i.e. the serial PC port which is intended to be connected to the repeater port (P31) at local control (see the figure).

Modem speed reflects the transfer speed between the OMT32/PC and the modem at remote control (to be set to 9600 baud).

On the **OMT phone number** line, type the phone number to the remote control PC modem. It is recommended not to type spaces, hyphens or other characters, but numerals only.

Modem init string reflects the modem initiation string to be sent by OMT32 to the modem at remote control.

The default string is usable for most Hayes compatible modems.

When ready, click the **Next>** button.

13. In the *OMT Log File Settings* dialog box, select the OMT32 log file.

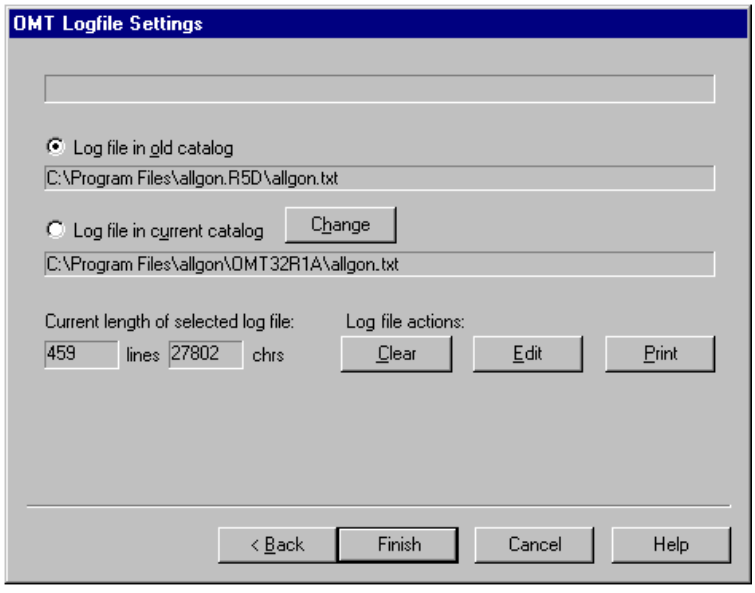


Figure 6-6. Log file settings

The log file is further detailed on page 6-11.

Log file in old catalog

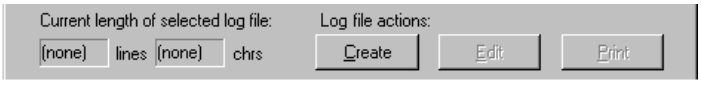
Shows the currently used log file. At upgrading to a new OMT version, the old log file in the old program folder is shown.

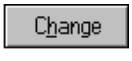
By selecting this option, OMT32 will continue writing to this log file.

Log file in current catalog

Suggests a new log file in the current program folder. If OMT32 already uses a log file located in the current program folder, then this path is the same as the above path.

When upgrading the OMT version, the suggested new log file can be created by clicking the *Create* button, which appears if the suggested log file does not exist (*none* is shown in the *lines* and *chrs* boxes).





A new log file with a different path or name can also be created by clicking the **Change** button and selecting a new path or name.

Current length of selected log file

Selected log file size, in number of lines and characters, is shown in the *lines* and *chrs* boxes. *(none)* is shown if the log file does not exist.

Log file actions

Selected log file can be cleared, edited or printed out using the **Clear**, **Edit**, and **Print** buttons.

When ready, click the **Finish** button.

14. If you want the OMT32 program to start after finishing the installation, check the 'Yes' box before clicking the **Finish** button:

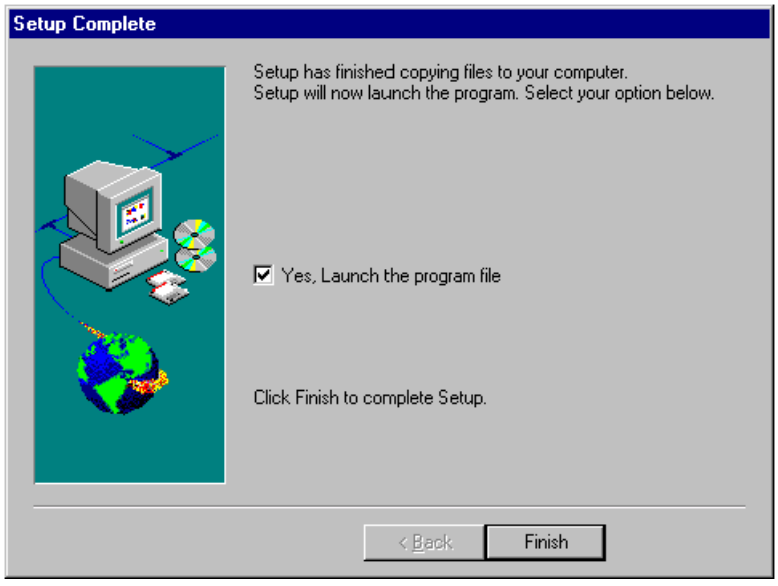


Figure 6-7. Installation completed

The OMT32 installation is now completed and a new program folder is created, see the next section.

Program Folder

A new *Allgon OMT32 R1A* program folder is created that looks like this:

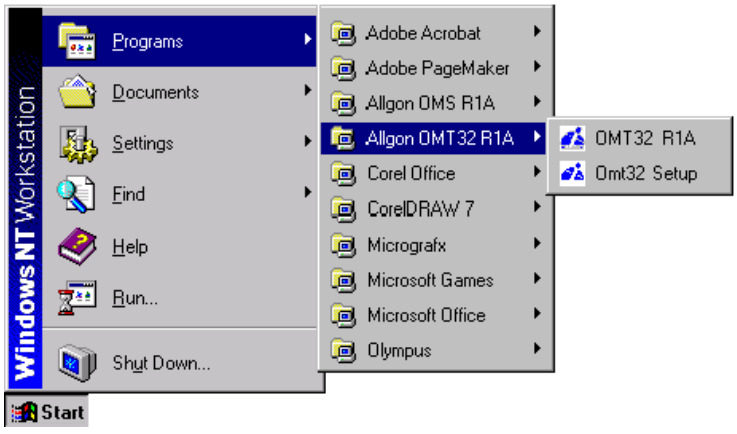


Figure 6-8. OMT32 program folder

The program folder contains start icons for OMT32 and OMT Setup.

The installation program cannot delete start icons from previous OMT installations. So, if you have a previous installed OMT, then you have to remove the program and the old start icons manually.

OMT32 Start Icon

OMT32 is started by clicking the OMT32 R1A start icon.

If you have placed the start icon in the *Startup* folder at the installation, OMT32 will start automatically.

If you have not placed the start icon in the *Startup* folder during the installation, you can move or create a new start shortcut for OMT32 and move it to the *Startup* folder at any time by dragging and dropping.
A shortcut in the *Desktop* folder can also be very useful.

Information about creating and moving shortcuts is found in the Windows manual.

OMT32 Setup Icon

You can change the OMT32 initial settings by starting the OMT32 Setup program. See the *Initial Settings* section on page 6-12.

Sound at Repeater Alarm Reception

By adding a sound parameter to the OMT32 shortcut, you will get an attention sound from the computer bell each time an alarm is received from a repeater.

Add the sound parameter as follows:

1. Make sure that the OMT32 is not running.

2. For each of the existing *OMT32 R1A* start icons (e.g. at the desktop, in the start menu, in the *Startup* folder, and in the program folder), add the sound parameter as follows:

- Highlight one of the *OMT32 R1A* start icons.
- While the icon is highlighted, press the <Alt> and <Enter> keys (or select the **Properties** option in the **File** menu in *Windows Explorer*).
- In the Properties dialog box, click the *Shortcut* tab.
- Add a space and '`-SOUND`' to the *Target* line, see Figure 6-9.

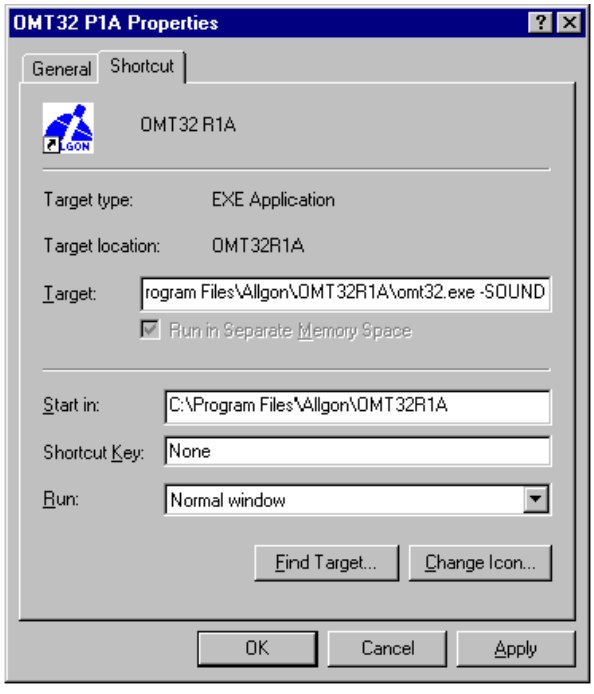


Figure 6-9. Sound at repeater alarm reception

- When ready, click **OK**.

3. Add the sound parameter to the rest of the shortcuts used.

Now, if you start the OMT32, an attention sound is heard each time OMT32 receives a repeater alarm.

The sound parameter can, at any time, be removed. Do not forget to exit OMT32 prior to removing the sound parameter in the shortcuts.

Automatic OMT32 Recovery

For information about how to configure the system to recover automatically after a system breakdown, e.g. after a power failure, refer to the Windows manual.

Screen Saver

Some screen savers might have a disturbing effect on OMT32. To ensure a proper OMT32 functionality, check the specific screen saver you intend to use by running it while OMT32 is in operation.

Uninstalling OMT32

If you want to uninstall OMT32, use the Windows system feature that removes the program files and program related files and information from the system. This feature is available by selecting the **Settings**, **Control Panel**, and **Add/Remove Programs** in the **Start** menu.

The following software component is installed for OMT32 and is to be removed:

OMT32

For further information about uninstalling programs, refer to the Windows manual and on-line help.

Log File

The currently used log file is reflected in the *Log file in old catalog* field in the *OMT Log File Settings* dialog box (page 6-6). In this log file all events are continuously logged. The intention with the log file is to be able to see what has happened in the past. The text in this file is similar to the text shown in the OMT32 *Message Log* window.

The log file is a plain text file which can be viewed, edited, printed out, or cleared using a text editor or a word processor.

If the log file is deleted or removed, a new log file is created automatically by the OMT32.

Log File Size

Events are continuously stored in the log file. When the file reaches a size of 64KB, the operator will be alerted about the file size. This gives opportunity to move or delete the log file.

Log File Name and Path

By default, the log file is located in the OMT32 program folder, which e.g. can be *C:\Program Files\Allgon\OMT32R1A*.

The log file name is by default *allgon.txt*.

A new log file with a different name or path can, however, be set by starting the OMT Setup (see the next section) and changing the log file name or path in the *OMT Log File Settings* dialog box (page 6-6).

Initial OMT32 Settings

The OMT32 initial settings can be changed by using the OMT32 Setup as follows:

1. Male sure that the OMT32 is not running.

2. Click the *OMT Setup* icon.

The *Find OMT Installations* dialog box is shown, which is used to find OMT program files on the computer disks. This can e.g. be used when removing an old OMT version from the system.

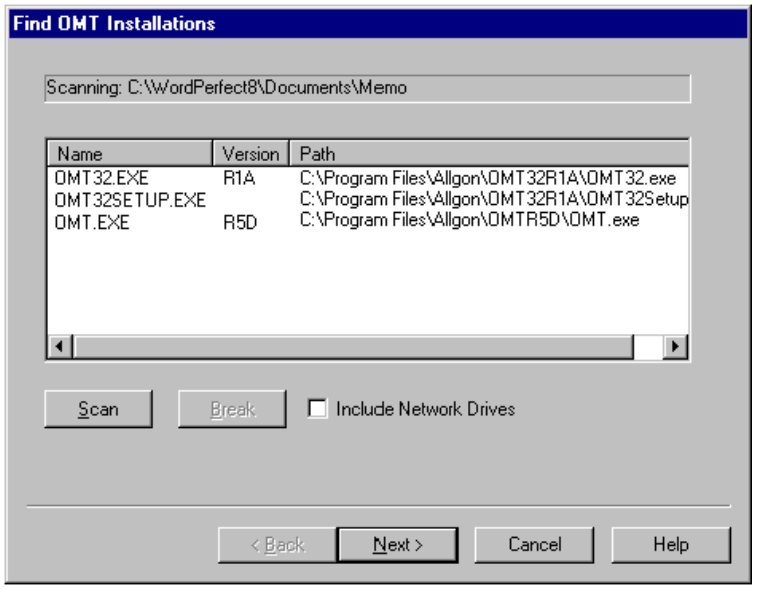
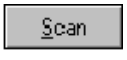
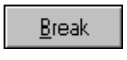


Figure 6-10. Locating OMT program files



To find Allgon OMT program files in the computer system, click the **Scan** button. Check the **Include Network Drivers** box to search also on connected network drives.



If you want to interrupt a search process, click the **Break** button.

The result is displayed as shown in Figure 6-10.

When ready, or if you do not want to use the search feature, click the **Next>** button.

3. The *OMT Basic Parameters* dialog box is shown (see page 6-4). The company and user name, and the window settings can be changed.

4. The *OMT Communication Parameters* dialog box is then shown (see page 6-5). Modem and local ports, modem speed and initiation string, and the OMT32 phone number can be changed.

5. Finally, the *OMT Log File Settings* dialog box is shown (page 6-6). The log file can be selected in this box.

The setup program is then finished.

7. Help

There are two kinds of help for operating and configuring the OMT32.

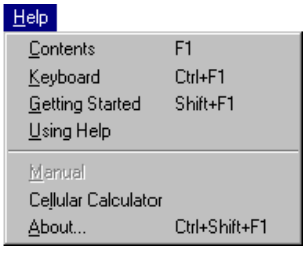
- On-line help is available as described below.
- Manuals are available in hardcopy as well as PDF-format, see the *Manuals* section below.

On-Line Help

The following kinds of on-line help is available:

- Help found under the Help menu
- Text-sensitive dialog box help
- Button hints
- Status bar help

Help Menu



Help is found in the OMT32 main window by selecting the **Help** menu, which contains a number of help options. This help is sorted by topics. A word or phrase search feature is also available.

Dialog Box Help

There is a help button in most of the dialog boxes. This button opens a help window containing an explanation of the dialog box items and other information about the function. Some dialog boxes have, however, a help button but no help implemented.

The help window can also be opened by pressing the <F1> key.

Button Hints

When the mouse pointer is placed over a button in the main window button bar, a button hint is shown at the mouse pointer.

Status Bar Help

The status bar at the bottom of the main window, see Figure 7-1, shows some button and main menu information.

Figure 7-1. Status bar help

Manuals

The following comprehensive manuals are available for the repeaters and the OMT32 software.

- The *AR Repeaters & OMT32, User's Manual* is available as hardcopy as well as in PDF-format.

  Hardcopy manual part # is VD 202 90/EN (English version).

  The same manual in PDF format is found in the *Doc* folder on the OMT32 CD-ROM as OMT32-EN.PDF (English version).

- The *R2R, Repeater to Repeater Link Kit, Installation Guide* is available as hardcopy as well as in PDF-format.

  Hardcopy manual part # is VD 202 91/EN (available in English only).

  The same manual in PDF format is found in the *Doc* folder on the OMT32 CD-ROM as R2R-EN.PDF.

An Acrobat Reader installation file is included in the OMT32 CD-ROM as well. It is found in the Acrobat filder.

8. Getting Started

In this chapter you will find a description of how to get the OMT32 system in operation. The description comprises the OMT32 main window and how to connect to repeaters, locally as well as remotely.

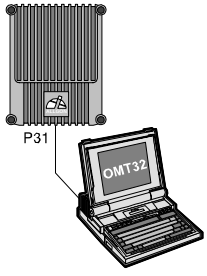
If the OMT32/PC is not already connected to a repeater or modem, then perform the preparation described below.

Preparation

Prepare for either local or remote PC control as described below.

Local Connection

If you intend to control a repeater locally, then make the following preparations:



1. Connect the OMT32/PC to the repeater.

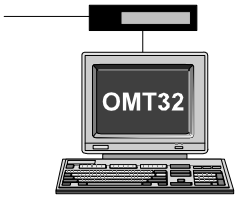
   Use the provided serial cable and connect that COM port on the PC which was selected for local connection during the OMT32 installation (described in Chapter 6) to the P31 PC port on the repeater (located to the right in the repeater cabinet).

   Local connection is further detailed in the *Connection* section in Chapter 3.

2. Turn the repeater on.
3. Turn the PC on.

Remote Connection

If you intend to control a repeater remotely, then make the following preparations:



1. Ensure that the OMT32/PC is connected to the PC modem.
2. Ensure that the repeater is on.
3. Turn the modem and PC on.

Start Up OMT32

OMT32 R1A

Start the OMT32 by clicking the OMT32 icon.

When the OMT32 is running, the main window is shown, see below.

OMT32 Main Window

The OMT32 main window (Figure 8-1) is shown after starting the program. Most of the buttons in the button bar are, however, inactive until you have logged on a repeater.

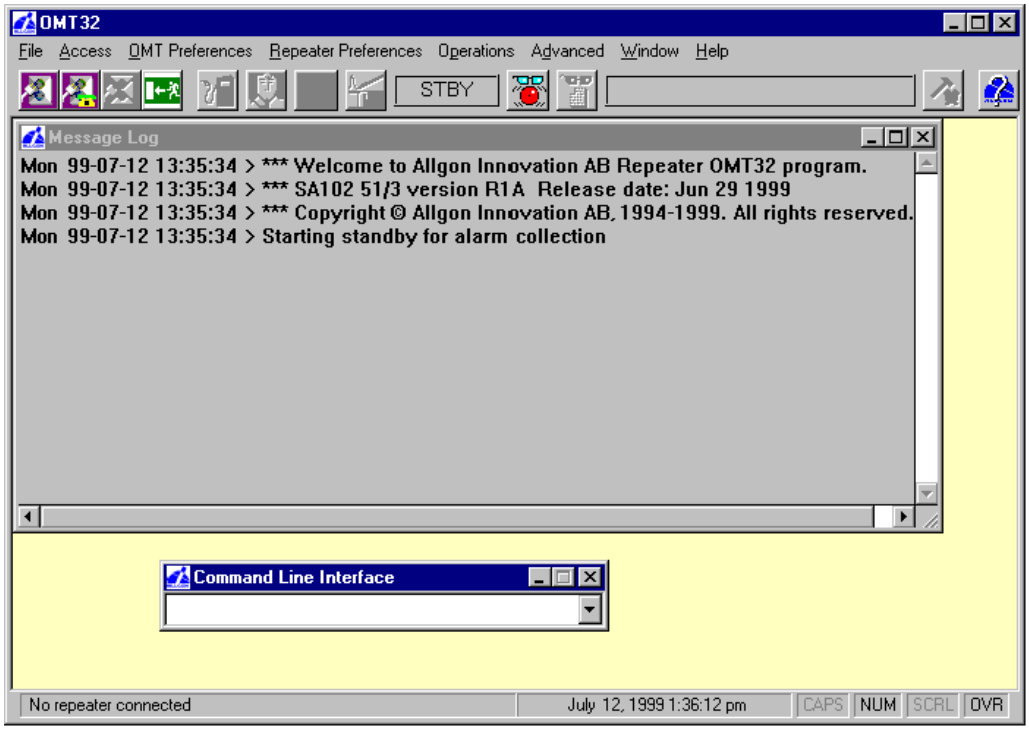


Figure 8-1. OMT32 main window before logging on

The items in the OMT32 main window is detailed on page 8-10.

The next section describes how to connect OMT32 to a repeater.

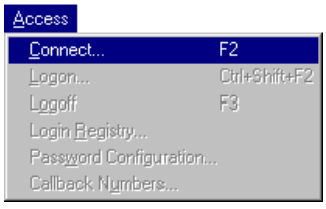
Connecting Repeater

The target repeater must be in operation when connecting to it.

If the repeater is not in operation when connecting to it, then the OMT32 cannot receive requested information from the repeater, such as the repeater type.

A steady yellow light on the repeater front indicator shows that the repeater is in operation.

Click the local or remote connect button or select the **Connect** option in the **Access** menu to connect OMT32 locally or remotely to a repeater.



The following dialog box is shown if you use the menu option:

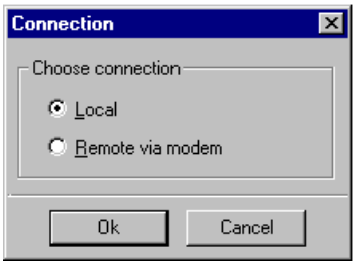
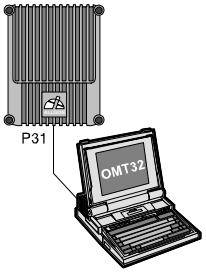


Figure 8-2. Local or remote connection

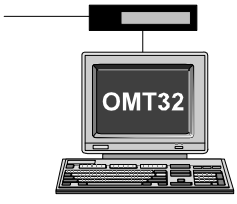
Local



Select this option if the PC is locally connected to the repeater with a cable.

On this option, the OMT32 will show a logon box (described on page 8-6).

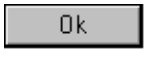
Remote via modem



Select this option if the PC is remotely connected to the repeater via modem and a telephone line or a mobile phone.

On this option, the OMT32 will show a dialing box for selecting phone number to the repeater (described on page 8-4).

Ok



After selecting local or remote connection, click the **Ok** button.

Remote Connection

If you have selected remote control, the *Dial Repeater* dialog box is shown, in which you can select a repeater to connect to:

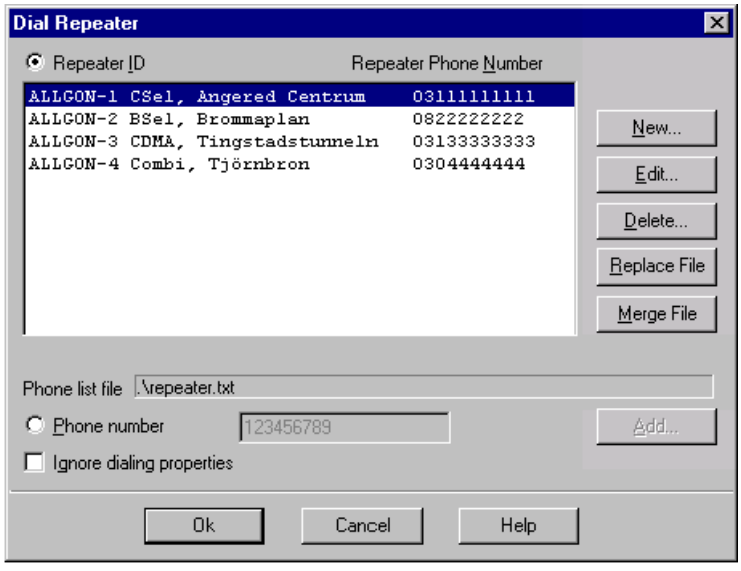


Figure 8-3. Dialing repeater for remote connection

Repeater ID

This option enables the repeater list containing repeater names and phone numbers.

The included repeaters are sorted in alphabetic order.

Phone list file

Shows the file in which the repeater list with the phone numbers is stored.

Repeater Phone Number

Repeater phone numbers (area codes and phone numbers) to the repeaters which are to be called.

Phone number

By clicking this option, you can enter and use a second phone number to the highlighted repeater, without changing the permanent number. To reset to the first number, click the *Repeater ID* option.

Ignore dialing properties

The dialing parameters set in the *Remote Connection Parameters* dialog box (see the *Remote Connection* section in Chapter 9) are ignored at dialing, if this box is checked.

New

Click this button to add a new repeater to the list.

Edit

Click this button to edit the selected repeater name or phone number.

Delete

Click this button to delete the selected repeater from the list.

Replace File

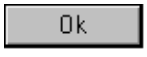
By clicking this button, you can replace the repeater list file, if you e.g. have upgraded the OMT32 or want to use a file from another system.

Merge File

By clicking this button, you can merge repeaters from another repeater list to the current repeater list, which will then contain the repeaters from both the lists.

Add

Click this button to replace the permanent phone number with the second number (in the *Phone number* box) for the highlighted repeater.



Ok

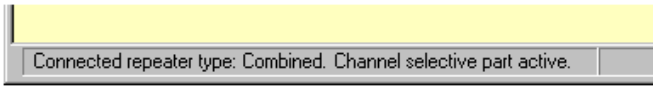
Dial a repeater by double-clicking the line or by selecting line and clicking the **Ok** button.

Logging On

After selecting local connection or, for remote control, after dialing the repeater, the OMT32/PC connects to the repeater.

Prior to the connection, the status bar, at the bottom left of the the main window, displays the following text:

When the connection is established, the status bar shows connected repeater type. If a combined channel/band selective repeater is connected, active part is also shown like this:



After the connection is established, you can log on the repeater.

Depending on whether the connected repeater is a single repeater or a repeater included in an R2R, *Repeater to Repeater Link* network, the logon procedures are different.

The following description details first a single repeater logon, and then an R2R, *Repeater to Repeater Link* network logon.

Single Repeater Logon

The following logon dialog box is shown if a single repeater is connected:

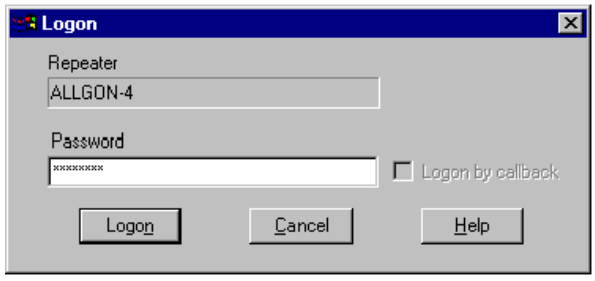


Figure 8-4. Single repeater logon

Repeater

The name of the connected repeater.

Password

Type the password on this line. There are three logon levels. Each of which can have a unique password. The logon levels are:

- Full privileges
- Read/Write privileges
- Read privileges

The logon levels are further detailed in the *Password and Callback* section in Chapter 10.

To keep the password safe at typing, asterisks are displayed in this field.

When ready, click the **Logon** button.

Logon by callback

If you are about to log on using a password which requires callback, just check this box and click the **Logon** button.

The repeater will call you back, provided that your phone number is included in the *Repeater Callback Numbers* list (in the repeater) and in the *Remote Connection Parameters* field (in the OMT32).

After being called back, the logon dialog box is shown again and you can type the password and log on as described above.

The callback feature is further detailed in the *Password and Callback* section in Chapter 10.

Repeater Network Logon

The following logon dialog box is shown if a repeater included in an R2R, *Repeater to Repeater Link* network is connected:

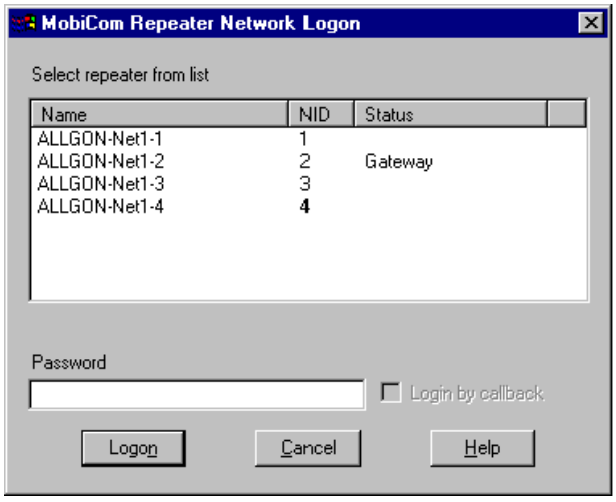


Figure 8-5. Repeater network logon

In this dialog box, you can select the desired repeater and then enter the password or check the callback box in the same way as described for the single repeater logon.

NID

Indicates the network ID number.

Status

Shows current status for each repeater. *Gateway* indicates the currently connected repeater.

Logon

When ready, log on the selected repeater by clicking the **Logon** button.

Logging On Old Repeater

If you log on a repeater that has a R1x version of the CU software, no password is required. If this is the case, you can log on by simply clicking the **Logon** button.

Important About the Mouse Buttons

Windows acts busy when a mouse button is pressed down, which means that the communication supervisory feature may be blocked after 10 seconds and log you off.

When you are logged on a repeater, avoid keeping the mouse button pressed down.

Main Window After Logging On

After logging on, the main window is shown with all features accessible and the button bar active in all.

The CSel/BSel button is, however, active only if a combined channel/band selective repeater is connected.

The main window looks like this:

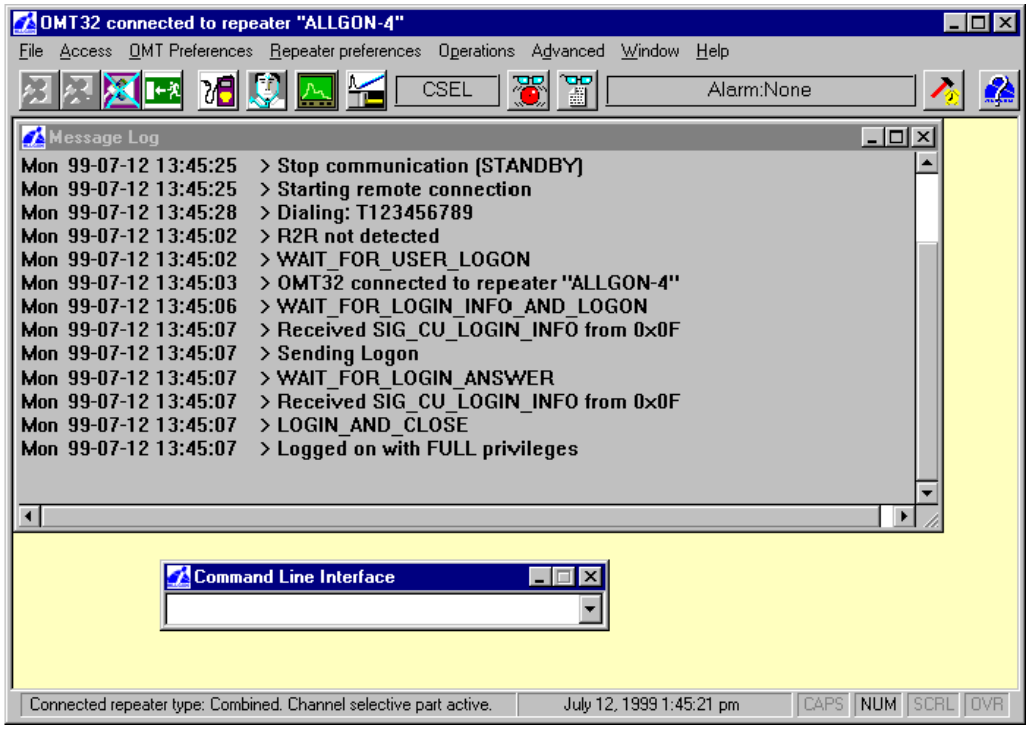


Figure 8-6. OMT32 main window after logging on

The OMT32 main window can be enlarged to full screen size by clicking the top right button, if shaped like this figure.

Switch to customized window size by clicking the same button, if shaped like this.

To minimize the window, click the button shaped like this.

Status Bar

The status bar at the bottom left of the main window shows context-sensitive information when the mouse pointer is over the button bar, or when a main menu option is pulled down.

When the mouse pointer is not over the button bar, the status bar shows connection status.

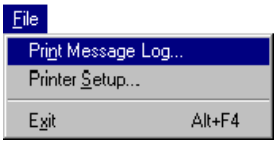
If an OMT32/PC is not connected to a repeater, the status bar text reads: *No repeater connected*.

After connection to the repeater the status bar text shows the repeater type and, if a combined repeater, active part. Available repeater types:

- Channel selective
- Band selective
- Combined
- CDMA

Message Log

The message log contains all commands and OMT32 actions in chronological order since the OMT32 was last started.



The message log can be printed out by selecting the **Print Message Log** option in the **File** menu.

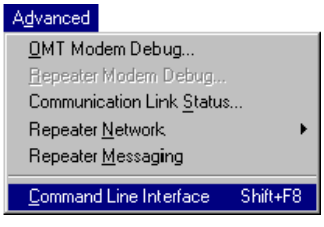
Main menu and button bar

From the OMT32 main window you have access to all features, which can be selected in the following ways:

1. By clicking the buttons in the button bar. The most frequently used commands have buttons.
2. By selecting from the main menu. A reference guide, containing all the main menus, is found in *Appendix A - Menu Reference Guide*.
3. By selecting from the main menu using the <Alt> key and the underlined menu letter simultaneously, e.g. **<Alt>** + **A** and **o** gives the **Logoff** command in the **Access** menu.
4. By using the short key commands indicated in the main menus, e.g. <F2> gives the **Connect** command in the **Access** menu.
5. By typing the commands using the *Command Line Interface* (see below).

Command Line Interface

Some commands can be entered using the *Command Line Interface*, CLI.



The CLI is accessible by clicking the icon shown in the main window, or by selecting the **Command Line Interface** option in the **Advanced** menu.

Further information about this feature is found in the *Command Line Interface* section in Chapter 9.

9. OMT32 Features

This chapter describes features related to the OMT32 program and its operation, i.e. OMT32 preferences and features that can be performed without connecting to a repeater. Operations that require connection to a repeater are found in Chapter 10, *Repeater Operations*.

The following features are described:

- Connection parameters, page 9-2.
  Parameters for local and remote connection to repeaters.
- CLI, Command Line Interface, page 9-6.
  Syntax and commands used for the Command Line Interface.
- Cellular calculator, page 9-8.
  Shows channel data for various systems and channels.
- OMT32 version, page 9-9.
  Software part number and version for the OMT32.
- Exiting OMT32, page 9-10.
  The various ways to exit the OMT32.

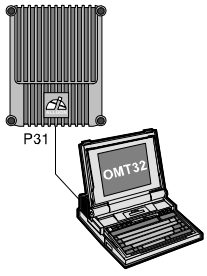
Connection Parameters

In this section you will find information about how to set connection parameters for the OMT32/PC and its modem.

It comprises:

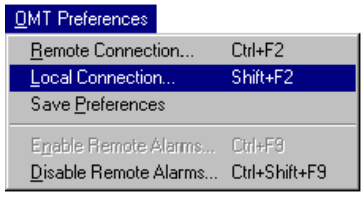
- PC port for local connection.
- PC port, phone number and OMT32/PC modem initiation string for remote connection.

Local Connection



The OMT32/PC port intended to be used for local connection to repeaters can be selected as described below.

Select the **Local Connection** option in the **OMT Preferences** menu.



The *Local Connection Parameters* dialog box, see Figure 9-1, is opened.

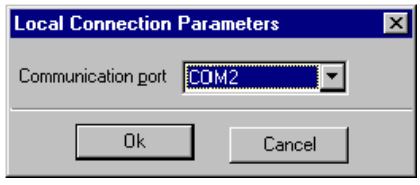
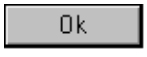


Figure 9-1. Local connection port

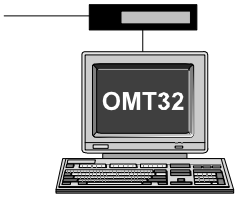
In the *Communication port* box, select PC port for local connection.



Click the **Ok** button.

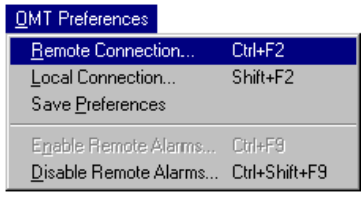
The local connection port can also be set in the OMT32 setup program (see the *Initial Settings* section in Chapter 6).

Remote Connection



The OMT32/PC port for remote connection to repeaters via modem, phone number, modem initiation string, and frequently used dialing properties can be set as describe below.

Select the **Remote Connection** option in the **OMT Preferences** menu.



The *Remote Connection Parameters* dialog box, see Figure 9-2, is opened.

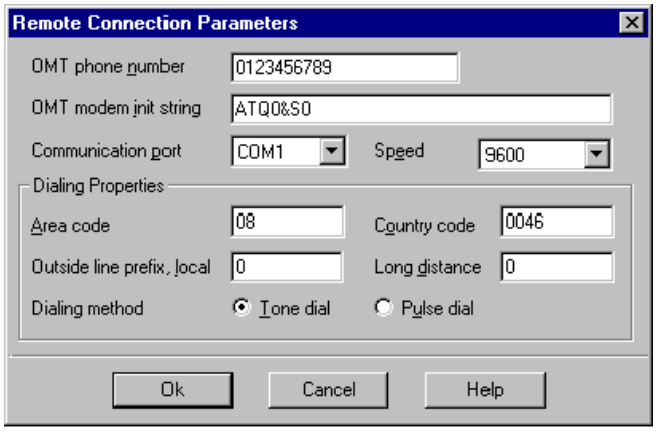


Figure 9-2. Remote connection parameters

The settings in the upper part of this dialog box can also be made in the OMT32 setup program (see the *Initial Settings* section in Chapter 6).

OMT phone number

The phone number to the OMT32/PC modem.

☞ *To be able to use passwords with callback, the phone number in this field must correspond, character by character, to the callback number stored in the repeater.*

The callback feature is described in the *Password and Callback* section in Chapter 10.

OMT modem init string

The initiation string to the OMT32 modem. The default modem initiation string is: ATQ0&S0

Communication port

Serial PC port for remote control via modem.

Speed

Modem transfer speed in bps (baud rate) for the OMT32/PC modem.

Dialing Properties

Dialing properties for dialing from repeaters to OMT32 and the other way round, i.e. from OMT32 to repeaters.

Parameters for calling repeaters can be ignored at dialing by checking the *Ignore dialing properties* box in the *Dial Repeater* dialog box (described in the *Remote Connection* section in Chapter 8).

Area code

Area code to the place where the OMT32 is located. Enter any prefix, if applicable.

This area code will be used by repeaters when dialing OMT32, if dialing from other areas.

Country code

The country code to the place where the OMT32 is located. Enter the country prefix, if applicable.

This country code will be used by repeaters when dialing OMT32, if dialing from abroad.

Outside line prefix, local

The prefix to get the line where the OMT32 is located. A common prefix for companies is '0' to come through the switchboard.

This prefix will be used by OMT32 when dialing repeaters.

Long distance

Prefix to be used for long distance call, e.g. any long distance block code, etc. Enter also the prefix to get the line where the OMT32 is located (the same as the previous code) if this also is to be used. This field will thus include the complete code required to make a long distance call.

This code will be used by OMT32 when dialing repeaters in other areas.

Dialing method

Select either *Tone dial* or *Pulse dial* for dialing OMT32. *Pulse dial* may be used in old systems.

The dialing method will be used by repeaters when dialing OMT32.

Command Line Interface

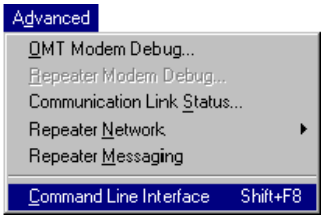
The *Command Line Interface*, CLI, is provided as a quick way of communicating with a connected repeater. Rather than using the normal Windows dialog boxes the user can interact with the repeater more directly.

The Command Line Interface feature does not check whether entered values are within permitted range or not. So, you MUST know the system very well before setting gain and power levels using the Command Line Interface.

The CLI provides several advantages:

- Users accustomed to a keyboard based operating system do not have to adjust immediately to an entirely novel system.
- Single parameters can be set.
- Without touching the mouse, the experienced user can perform operations quicker.
- Using the CLI prevents the screen from getting clogged up with lots of windows.
- Using the CLI is more memory efficient.

If the CLI is iconized, then double-click the *Command Line Interface* icon or select the **Command Line Interface** option in the **Advanced** menu.



Commands can be entered on the command line like this:

By clicking the last entered commands can be reselected, edited and entered again.

A command list with command syntax is found below.

Command Syntax

The following command syntax is valid for the Command Line Interface:

MAIN_COMMAND-SUB_COMMAND [**:**PAR1, PAR2, ...]**;**

Note that each line must be ended with a semicolon (;).

If a command is entered with an incorrect syntax, an error message with a mismatch explanation is shown.

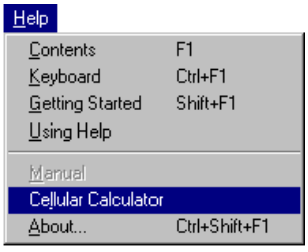
Command List

Main Command	Command/Parameter/Sample	Description
OM	**OM-EXIT**	Exits the OMT32 program
General OMT32 program	Parameter: [NOW]	No confirmation
	Ex.: OM-EXIT;	Exit after confirmation
	Ex.: OM-EXIT: NOW;	Exit without confirmation
TIME	**TIME-WRT**	Time setting
Internal repeater clock date and time	Parameter: HH.MM.SS	Hour-Minute-Second
	Ex.: TIME-WRT: 13.25.30;	Time setting: 13:25:30
	TIME-WRD	Date setting
	Parameter: YYYY-MM-DD-WW[W...]	Year-Month-Day-Weekday
	Ex.: TIME-WRD: 1999-07-12-MON;	Date setting 1999-07-12-Monday
PAR	**PAR-COMBATT**	Uplink/downlink combiner attenuation
Parameters and repeater ID	Parameter 1: U[P]/D[OWN	Uplink/Downlink
	Parameter 2: *value*	Combiner attenuation value
	Ex.: PAR-COMBATT: U, 6;	Uplink combiner attenuation 6dBm
	PAR-CHAN	Links a repeater channel to a GSM/CDMA channel
	Parameter 1: #	Repeater channel number (1-4)
	Parameter 2: #	GSM/CDMA channel number
	Ex.: PAR-CHAN: 2, 116;	Repeater channel #2 is linked to GSM/CDMA channel #116
	PAR-CHACT	Turns a repeater channel on/off
	Parameter 1: #	Repeater channel number (1-4)
	Parameter 2: ON/OFF	Channel on/off
	Ex.: PAR-CHACT: 3, ON;	Repeater channel #3 on
	PAR-GAIN	Uplink or downlink channel gain
	Parameter 1: #	Repeater channel number (1-4)
	Parameter 2: U[P]/D[OWN	Uplink/Downlink
	Parameter 3: *value*	Gain value
	Ex.: PAR-GAIN: 4, D, 34;	Repeater channel #4 downlink 34dB gain
	PAR-REPID	Connected repeater is assigned a new ID string
	Parameter: *string*	ID for the connected repeater
	Ex.: PAR-REPID: new;	Connected repeater ID = 'new'
BSA	**BSA-GAIN**	Uplink or downlink gain
Band selective parameter	Parameter 1: U[P]/D[OWN	Uplink/Downlink
	Parameter 2: *value*	Gain value
	Ex.: BSA-GAIN: DOWN, 36;	Downlink gain 36dB
	BSA-FREQ	Uplink or downlink frequency
	Parameter 1: U[P]/D[OWN]	Uplink/Downlink
	Parameter 2: *value* (12.5KHz steps)	Frequency in MHz
	Ex.: BSA-FREQ: UP, 890.5;	Uplink frequency 890.5 MHz
	BSA-AGC	Uplink or downlink Automatic Gain Control on/off
	Parameter 1: U[P]/D[OWN]	Uplink/Downlink
	Parameter 2: ON/OFF	Automatic gain control on/off
	Ex.: BSA-AGC: D, ON;	Downlink AGC on
	BSA-PAON	Uplink or downlink PA board on/off
	Parameter 1: U[P]D[OWN	Uplink/Downlink
	Parameter 2: ON/OFF	PA board on/off
	Ex.: BSA-PAON: UP, OFF;	Uplink PA off

Cellular Calculator

A calculator for channel data is included in the OMT32. This calculator is intended to be a help for cell planning work.

The cellular calculator is used as described below.



Open the calculator by selecting the **Cellular Calculator** option in the **Help** menu.

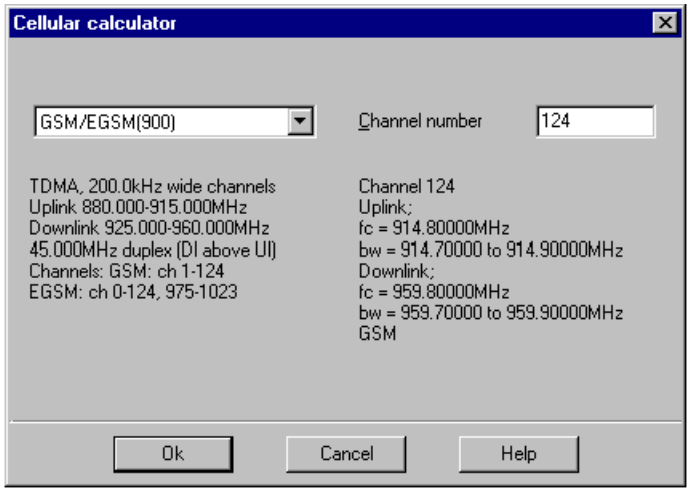
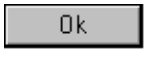


Figure 9-3. Cellular channel calculator

The calculator shows channel data for various cellular systems and channels as follows:

1. Select the desired system in the left box.

2. Select channel number in the right box.

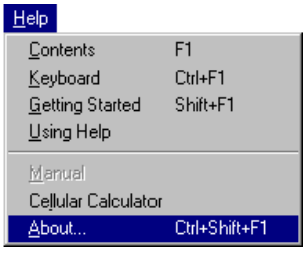


3. Click the **Ok** button.

The channel data is shown for the selected system and channel.

In this system, the channel selective 900, 1800, and 1900 systems are called GSM, DCS and PCS respectively. These systems may, however, have different names in different parts of the world.

OMT32 Version



An information box with the registered OMT32 holder and the OMT32 part number and version is shown by selecting the **About** option in the **Help** menu.

Figure 9-4. OMT32 version

Exiting OMT32

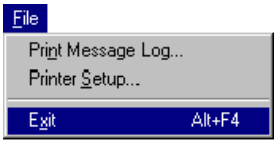
You can exit OMT32 in many different ways:

- Click the exit button.

- Press <Alt>+<F4> simultaneously (or <Alt>+F+X).

- Double-click the close box in the upper left corner of the main window.

- Click the close box in the upper right corner of the main window.



- Select the **Exit** option in the **File** menu.

If you are currently logged on a repeater, you will be logged off prior to exiting the OMT32.

All the exit options above will open the same *Quit OMT32* dialog box:

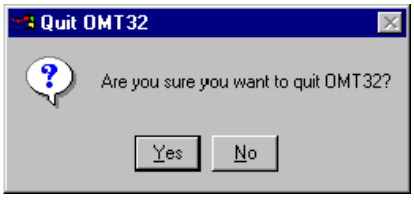


Figure 9-5. Exiting OMT32

Click the **Yes** button to exit OMT32.

10. Repeater Operations

This chapter describes features related to repeaters, i.e. features that require a previously performed repeater connection and logon (described in Chapter 8, *Getting Started*). Operations related to the OMT32 and its operation is found in Chapter 9, *OMT32 Features*.

Prior to the descriptions of the repeater operation, there is information about operational data in general, including modifying operational repeater data and swapping between active repeater parts.

The following main sections are described in this chapter:

Operational traffic related repeater data

- Operational data in general, page 10-2.
- Repeater configuration, page 10-4.
- Operational status, page 10-13.
- Testpoints, page 10-25.
- Traffic statistics, page 10-36.

Repeater hardware and software

- Repeater boards (CHA/BSA/CSA/PA/RIA), page 10-38
- Repeater software configuration, page 10-40

Access

- Password and callback, page 10-46
- Login registry, page 10-49

Miscellaneous

- Repeater modem parameters, page 10-50
- Repeater ID, page 10-52
- Repeater date and time, page 10-53
- Notepad, page 10-54
- Logoff, page 10-54.

All alarm handling is excluded from this chapter. The alarm handling is described in Chapter 11, *Alarms and Events.*

Operational Data in General

In this section, you will find some useful information about how to handling the operational data, including:

- Information about what happens when modifying operational repeater data.
- How to switch between active repeater parts when operating combi-repeaters.

Modifying Operational Data

Changing operational data is carried out by changing data in the operational dialog boxes and clicking the **Update** button.

When the *Update* button is activated, all data from the dialog box is downloaded to the repeater. Changed data as well as unchanged data is downloaded.

Then, all fields in the dialog box are blanked whereupon they are updated with data read from the repeater.

This procedure ensures that the information shown on the monitor corresponds to the information in the repeater.

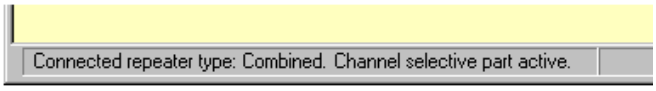
The status window and the testpoint window are, however, continuously updated with a time interval of 2 seconds.

This time interval is the reason to why it sometimes takes a few seconds for these windows to be updated.

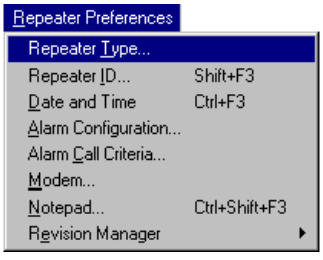
Active Repeater Part (Combined Repeaters Only)

If the connected repeater is a combined channel/band selective repeater, you can swap between the channel selective and the band selective part.

Current active part status can be read either on the button bar at the upper part of the main window, or on the status bar at the left bottom of the main window:



There are three ways of swapping active repeater part:



1. Select the **Repeater Type** option in the **Repeater Preferences** menu and click the **Change** button. This option gives also information about current active part:

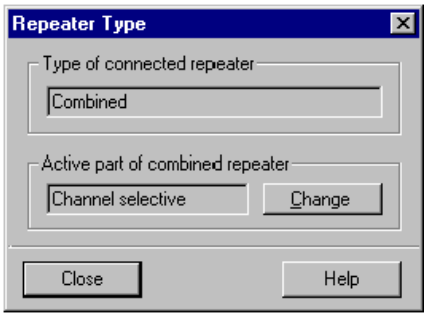
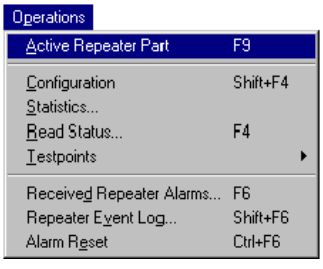


Figure 10-1. Active repeater part



2. Select **Active Repeater Part** in the **Operations** menu.

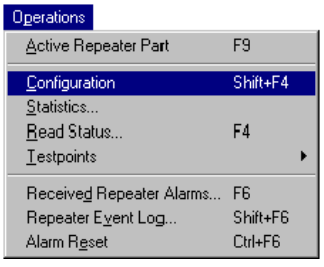
3. Click the BSel/CSel button.

Channel and band selective specific windows are changed when swapping between active repeater part.

Repeater Configuration

The purpose of channel selective repeater configuration is to set channel numbers, gain and combiner attenuation. For band selective repeaters, gain and frequency band edges are set.

The configuration window is opened by clicking the configuration button or by selecting the **Configuration** option in the **Operations** menu.



If you are connected to a combined channel/band selective repeater, then you can swap between channel selective active part and band selective active part (described on page 10-3).

You can make changes in most of the configuration window fields.

Modifications made in the configuration windows are downloaded to the repeater by clicking the **Update** button.

Values out of range are not accepted. An input error message is shown to inform about invalid values:

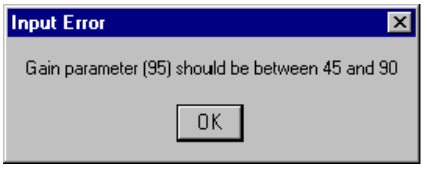


Figure 10-2. Invalid input value

Configuration descriptions

Configuration descriptions for the various repeater types are found on the following pages:

Channel selective GSM repeater ..... page 10-6
Channel selective CDMA repeater 10-8
Band selective repeater 10-11

Channel Selective GSM Repeater

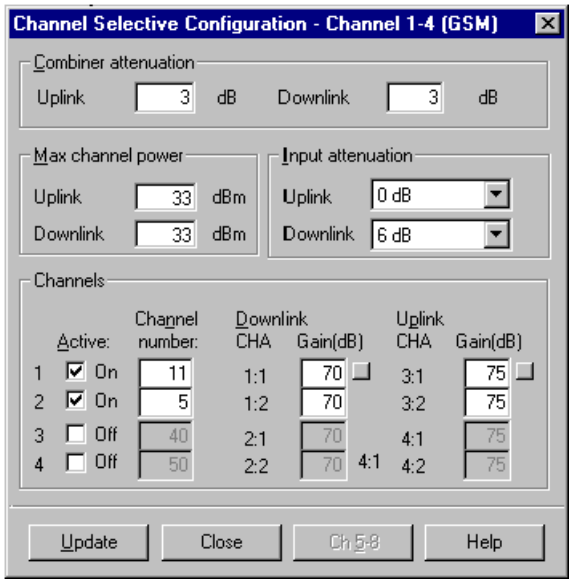


Figure 10-3. Channel selective GSM configuration

The upper part of the configuration window contains settings that affects all the channels. This includes combiner attenuation, max. power and input attenuation. The lower *Channels* part of the window contains individual channel settings.

Field description:

Combiner attenuation

Attenuation in the uplink (BS) and downlink (MS) combiners. The following values should be used:

0dB for 2 channels, channel selective operation only
3dB for 4 channels, channel selective operation only
3dB for 2 channels, channel selective + band selective operation
6dB for 4 channels, channel selective + band selective operation

Max channel power

Sets the maximum output channel power for uplink and downlink signaling (not supported by all repeater hardware versions).

Input attenuation

To be able to decrease very high antenna input signal strength, uplink and downlink signal inputs can be 6dB attenuated.

Click ▼ and select 0dB or 6dB attenuation.

Channels

Active

By clicking this box, the channel is toggled between active (☑) and inactive (☐).

Channel number

Channel number that can be selected within a range limited by the system and the repeater boards.

Downlink CHA

The channel board position numbers in the repeater cabinet and the internal channels on the boards.

1:1 = CHA1, board position 1 in the cabinet, internal board channel 1
1:2 = CHA1, board position 1 in the cabinet, internal board channel 2
2:1 = CHA2, board position 2 in the cabinet, internal board channel 1
2:2 = CHA2, board position 2 in the cabinet, internal board channel 2

Downlink Gain(dB)

The gain in the downlink signal path.

Setting range: 45dB to 90dB

To set the gain for all the channels to the same value as shown on the first line, click the adjacent button.

Individual channel board gain calibration may affect the setting range.

Uplink CHA

The channel board position numbers in the repeater cabinet and the internal channels on the boards.

3:1 = CHA3, board position 3 in the cabinet, internal board channel 1
3:2 = CHA3, board position 3 in the cabinet, internal board channel 2
4:1 = CHA4, board position 4 in the cabinet, internal board channel 1
4:2 = CHA4, board position 4 in the cabinet, internal board channel 2

Uplink Gain(dB)

The gain in the uplink signal path.

Setting range: 45dB to 90dB

To set the gain for all the channels to the same value as shown on the first line, click the adjacent button.

Individual channel board gain calibration may affect the setting range.

Channel Selective CDMA Repeater

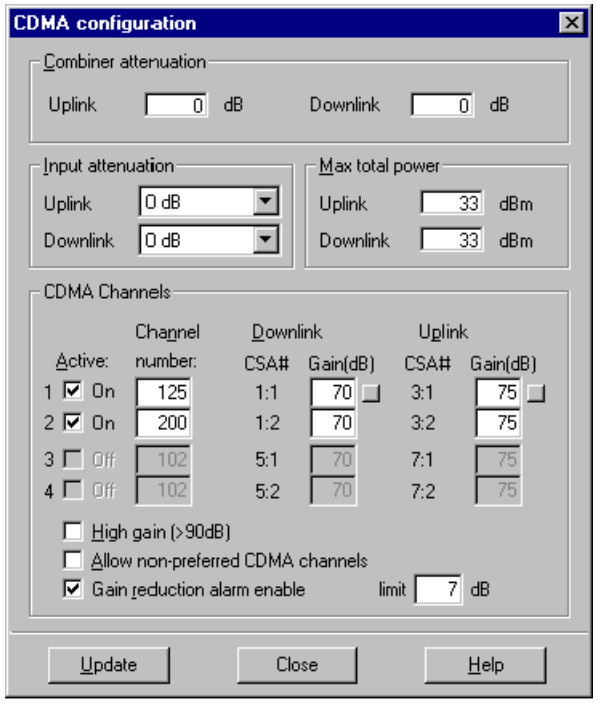


Figure 10-4. Channel selective CDMA configuration

The upper part of the configuration window contains settings that affects all the channels. This includes combiner attenuation, max. power and input attenuation. The lower *CDMA Channels* part contains individual channel settings.

Field description:

Combiner attenuation

Attenuation in the uplink (BS) and downlink (MS) combiners. The following value should be used:

0dB for 2 channels, CDMA operation only.

Input attenuation

To be able to decrease very high antenna input signal strength, uplink and downlink signal inputs can be 6dB attenuated.

Click ▼ and select 0dB or 6dB attenuation.

☞ *Input attenuation is implemented on repeaters running the R1B version or higher of the CU software.*

Max output power

Sets the maximum output power for uplink and downlink signaling.

CDMA Channels

Active

By clicking this box, the CDMA channel is toggled between active (☑) and inactive (☐).

Channel number

CDMA channel number that can be selected within a range limited by the system and the repeater boards.

Downlink CSA#

The channel board position numbers in the repeater cabinet and cover. This table shows the normal positions (may vary).

1:1 = CSA1, board position 1 in the cabinet, internal board channel 1
1:2 = CSA1, board position 1 in the cabinet, internal board channel 2
5:1 = CSA5, board position 5 in the cover, internal board channel 1
5:2 = CSA5, board position 5 in the cover, internal board channel 2

Downlink Gain(dB)

The gain in the downlink signal path.

Setting range: 45dB to 90dB

To set the gain for all the channels to the same value as shown on the first line, click the adjacent button.

Uplink CSA#

The channel board position numbers in the repeater cabinet and cover. This table shows the normal positions (may vary).

3:1 = CSA3, board position 3 in the cabinet, internal board channel 1
3:2 = CSA3, board position 3 in the cabinet, internal board channel 2
7:1 = CSA7, board position 7 in the cover, internal board channel 1
7:2 = CSA7, board position 7 in the cover, internal board channel 2

Uplink Gain(dB)

The gain in the uplink signal path.

Setting range: 45dB to 90dB

To set the gain for all the channels to the same value as shown on the first line, click the adjacent button.

Individual channel board gain calibration may affect the setting range.

High gain (>90dB)

When this box is unchecked, the gain can be set to maximum 90dB.

By checking this box, the gain is no longer limited to 90dB, but can be set to maximum 100dB.

Allow non-preferred CDMA channels

When this box is unchecked, only preferred CDMA channels can be selected.

By checking this box, non-preferred CDMA channels can be selected.

Gain reduction alarm

To keep the specified *Max output power* at increasing input signal strength (RSSI), the *Used gain* is decreased below *Gain set to*, see Figure 10-5.

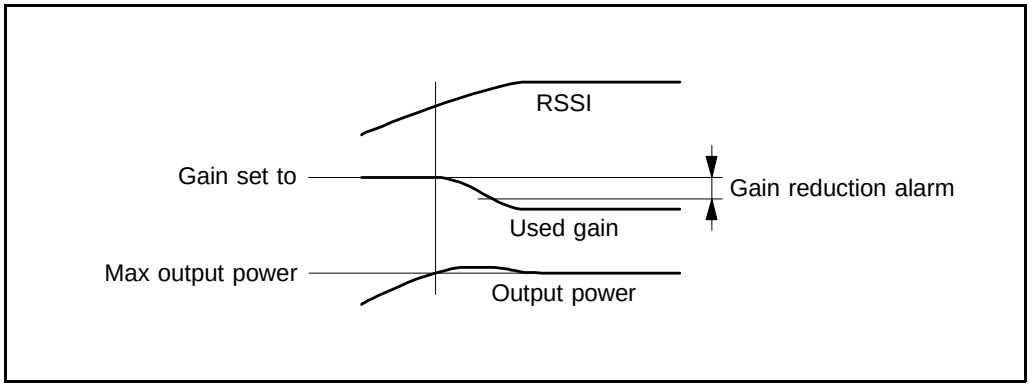


Figure 10-5. Gain reduction alarm

The gain reduction is indicated by the difference between the *Used gain* and *Gain set to* values in the status window (page 10-20), and by the text *Gain reduced* in the *AGC status* field in the same window.

When the difference between the *Gain set to* value and the *Used gain* value exceeds the value set in the *limit* field and the check box for the *Gain reduction alarm* is checked, then an alarm is generated.

Band Selective Repeater

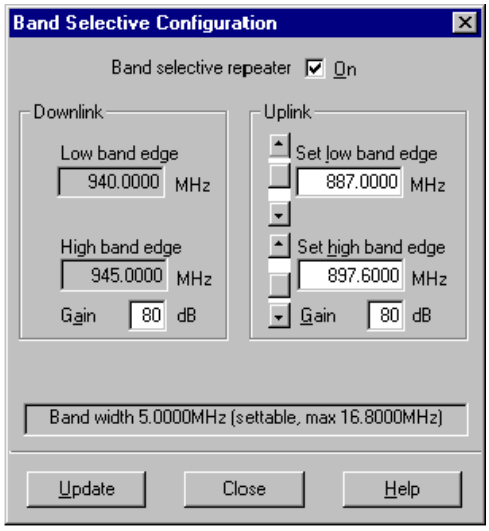


Figure 10-6. Band selective configuration

The left-hand part of the configuration window contains downlink information (BSA board #1 and PA board #1 located to the left in the cabinet or cover).

The right-hand part of the configuration window contains uplink information (BSA board #2 and PA board #2 located to the right in the cabinet or cover).

The downmost line indicates current band width and the band width status (fixed or adjustable).

Fixed band width

For repeaters that have fixed band width, the following three fields are changeable:

Downlink: *Gain*

Uplink: *Set low band edge*
Gain

The values in the remaining fields are automatically calculated from the band width and the uplink/downlink duplex spacing.

Adjustable band width

For repeaters equipped with BSA boards which can handle adjustable band width, the uplink *Set high band edge* field is also available and can be changed.

Figure 10-6 shows a repeater with adjustable band width.

Field description:

Band selective repeater

The band selective repeater, or the band selective part of a combined repeater, can be turned on/off by clicking this box.

The PA boards and the AGC (Automatic Gain Control) are turned off when the band selective repeater is switched off.

Downlink

Low band edge

Displays the downlink low band edge related to the uplink low band edge.

The difference is depending on the system duplex spacing.

High band edge

The downlink high band edge related to the band width.

Gain

The maximum downlink gain, i.e. the total gain from antenna port to antenna port.

Setting range: 45dB to 90dB

Uplink

Set low band edge

The lower band edge for the uplink signal. The band edge frequency can be increased or decreased by clicking the arrow buttons. The frequency is changed in 12.5KHz steps. Values can be typed into the field as well.

Setting range for this field is depending on the system and BSA boards.

Set high band edge

For fixed BSA boards, this field displays the uplink high band edge related to the band width. This band edge cannot be changed solely.

For adjustable BSA boards, this field is changeable and affects thus the uplink high band edge and thereby the band width.

Gain

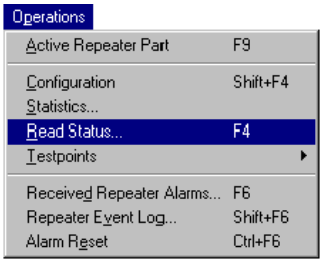
The maximum uplink gain, i.e. the total gain from antenna port to antenna port.

Setting range: 45dB to 90dB

Operational Status

Operational status shows mainly values set and values measured in the repeater.

The status window is opened by clicking the status button or by selecting the **Read Status** option in the **Operations** menu.



If you are connected to a combined channel/band selective repeater, then you can swap between channel selective active part and band selective active part (described on page 10-3).

You can only read from the status windows (no changes can be done).

Operational status descriptions

Operational status descriptions for the various repeater types are found on the following pages:

Channel selective GSM repeater ..... page 10-14
Channel selective CDMA repeater 10-20
Band selective repeater 10-23

Channel Selective GSM Repeater

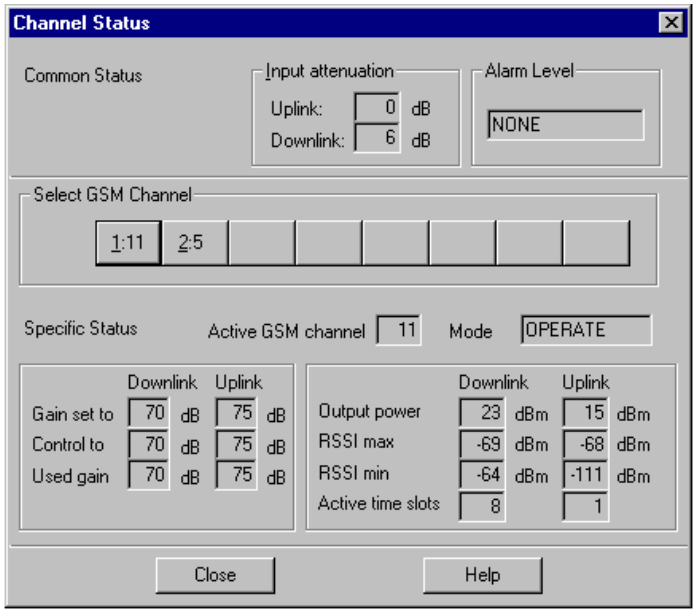


Figure 10-7. Channel selective GSM repeater status

The status window shows continuously updated operational status for the selected repeater.

Select channel by clicking a button in the *Select GSM Channel* button bar. Below the channel button bar, the information is specific to the selected channel.

Field description:

Common Status

Input attenuation

Uplink (MS) and downlink (BS) input signal attenuation.

Alarm Level

This field shows the text NONE when there is no active alarm. The alarm level is shown if an alarm is active. Alarm and alarm levels are further detailed in the *Alarm Overview* section in Chapter 11.

Button bar

Select GSM Channel

You can select GSM channel to be shown by clicking the corresponding button in this button bar. Those channel numbers which were selected in the configuration window (page 10-6) are shown on the buttons.

Only CHA boards present in the repeater are shown with button numbers. CHA boards not present are shown as non-numbered buttons.

Specific Status

Active GSM channel

Selected channel number for which the specific information is shown.

Mode

The current operational mode, which can be:

START UP	System startup. Normal startup time is 10 - 20 seconds after the mains is switched on.
OPERATE	Selected channel is in operation.
BLOCK	Selected channel is not in operation. An error may have occurred.
OFF	Selected channel is set to inactive in the configuration window (page 10-6).

Gain set to

Uplink and downlink gain set in the configuration window (page 10-6).

Control to

Calculated uplink and downlink setpoint values based on the values in the *Gain set to* field. Normally, they coincide with the *Gain set to* values.

Used gain

Actual momentary gain for the uplink and downlink transmission.

The gain may differ from the setpoint value due to poor antenna isolation. An antenna isolation test feature regulates the gain as follows:

- After powering up, resetting or updating, the gain is increased to 13dB above the *Control to* level (see Figure 10-8).

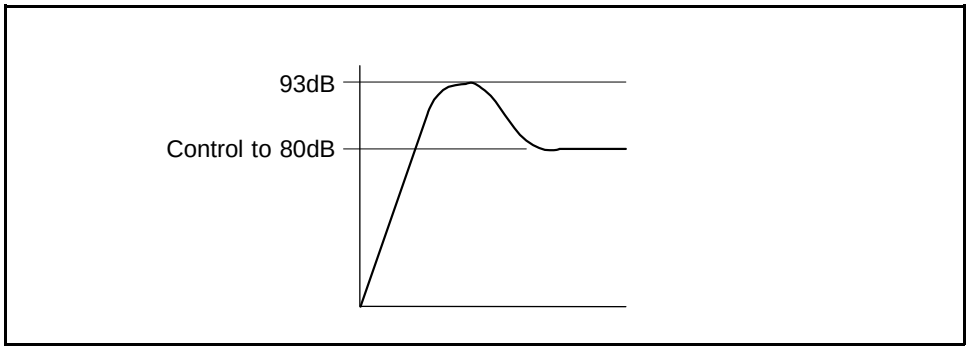


Figure 10-8. Antenna isolation margin test

The purpose of this 13dB 'over-gain' is to test if there is a 13dB antenna isolation margin. The gain increase can be seen in the *Control to* and *Used gain* fields.

- If no instability due to poor antenna isolation is detected during the antenna isolation test, the gain is decreased to the *Control to* level after 30 sec.

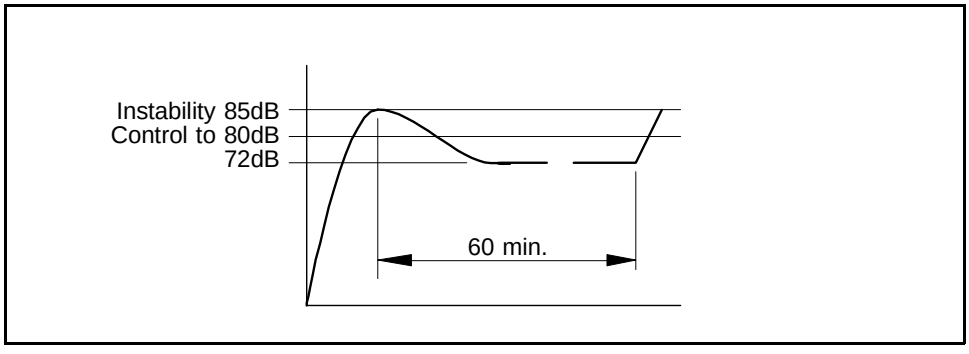


Figure 10-9. Gain regulation at poor antenna isolation

- If instability due to poor antenna isolation is detected during the antenna isolation test, the gain is decreased to a level 13dB below the lowest detected poor antenna isolation level (see Figure 10-9).

  Warning alarm is activated when instability is detected and *Ceasing* when the instability has ceased.

- The decreased gain level is kept for the next 60 minutes. Then, a new antenna isolation margin test is performed.

☞ *Output gain regulation is performed as soon as poor antenna isolation is detected during operation.*

If instability due to poor antenna isolation is detected at the lowest output gain, the channel is blocked and BLOCK mode is indicated in the status window. *Error* alarm is activated when instability is detected and *Ceasing* when the instability has ceased.

A constant CW signal in the GSM frequency band is a 'jammer' which may be harmful to the cellular system. A BTS might, in worst case, be disabled. The Allgon repeaters detect, however, strong CW signals. If a constant CW signal is detected (channel board test point *Power 1* or *Power 2* >27dBm), the channel is blocked and BLOCK mode is indicated in the status window. *Error* alarm is activated when the channel is blocked and *Ceasing* when the blocking has ceased.

Antenna isolation test and CW signal strength test are performed in the uplink path. Gain regulation is then performed for uplink as well as downlink using the uplink levels.

Antenna isolation test is a valuable feature to reveal isolation problems when installing repeaters. Also, it is very useful when making site specific repeater adjustments such as antenna configuration (i.e. donor and service antenna vertical and horizontal positions, beam alignment, and gain). The antenna isolation test is also useful to reveal other environmental problems that must be considered, e.g. reflections from buildings, masts, traffic, etc.

After performing the antenna isolation test, set the repeater gain (*Gain set to*) to the value obtained (13dB under the instability level). The repeater will then work with a safe gain margin to avoid instability.

It is not recommended to use the repeater isolation test in an instable environment to automatically and continuously adjust the gain from the gain set by the operator.

Output power

Measured output power level at the uplink (BS) and downlink (MS) antenna connectors for the selected GSM channel.

Shows '–' for power levels less than 1dBm.

The accuracy is better than ±2dB.

RSSI max

The strongest input time slot signal level during 2 seconds (see Figure 10-10), individually displayed for uplink and downlink signaling.

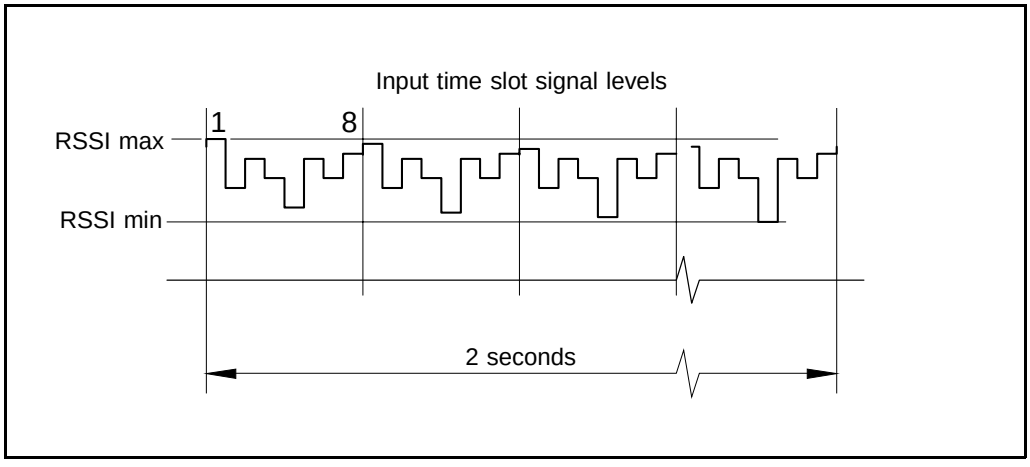


Figure 10-10. RSSI max and RSSI min

Shows '>' if the signal level is above the measuring range.
Shows '<' if the signal level is below the measuring range.

The measuring range is 50dB approximately and the upper limit is determined of that input level which gives the maximum output level from the repeater at the current gain setting.

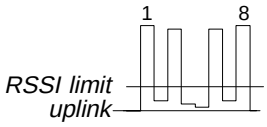
Minimum level is –100dBm approximately (at 90dB gain).

The accuracy is typical ±3dB.

RSSI min

The lowest input time slot signal level during 2 seconds (see Figure 10-10), individually displayed for uplink and downlink signaling.

The measuring range and accuracy is the same as *RSSI max*.



Active time slots

Number of active input time slots for which the signal level is higher than the *RSSI limit uplink* level or *RSSI limit downlink* level set in the *RSSI Statistics* window (page 10-36).

The figure shows four active uplink time slots.

The active time slots field can show 1 - 8 and '–' for none.

Channel Selective CDMA Repeater

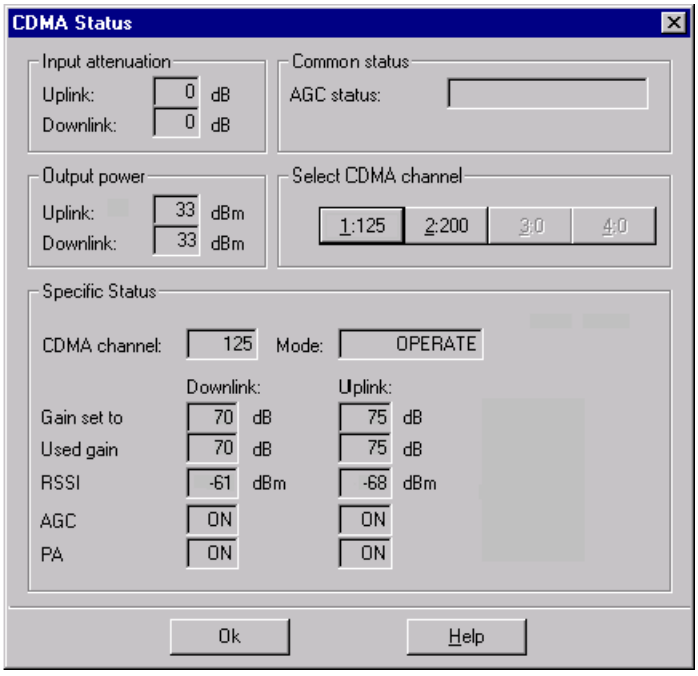


Figure 10-11. Channel selective CDMA repeater status

The status window shows continuously updated operational status for the selected repeater.

To select channel, click a button in the *Select CDMA Channel* button bar.

Below the channel button bar, the information is specific to the selected channel.

Field description:

Input attenuation

Uplink (MS) and downlink (BS) input signal attenuation (not applicable to all versions).

Common Status

The *AGC status* field can show AGC information such as *Gain reduced* (see *Gain reduction alarm* on page 10-10), and general information such as *Error!* at signal amplification failure.

At normal operation, this field is blank.

Output power

Shows the output power to the uplink and downlink antennas. Maximum power is set in the configuration window (page 10-8).

Button bar

Select CDMA Channel

Select a CDMA channel by clicking the corresponding button in the button bar. Those channel numbers which were selected in the configuration window (page 10-8) are shown on the buttons.

Only CSA boards present in the repeater are indicated with button numbers. CSA boards not present are shown as non-numbered buttons.

Specific Status

CDMA channel

This field shows the selected channel number for which the specific information is displayed.

Mode

The current operational mode, which can be:

START UP	System startup. Normal startup time is 10 - 20 seconds after the mains is switched on.
OPERATE	Selected channel is in operation.
BLOCK	Selected channel is not in operation. An error may have occurred.
OFF	Selected channel is set to inactive in the configuration window (page 10-8).

Gain set to

Uplink and downlink gain set in the configuration window (page 10-8).

Used gain

Actual momentary gain for uplink and downlink transmission based on the *Gain set to* value.

Normally, the *Used gain* coincides with the *Gain set to* value.

The *Used gain* can be decreased not to exceed the *Max output power* set (page 10-8). See *Gain reduction alarm* on page 10-10.

RSSI

Input signal level from the antennas.

AGC

Shows the text ON or OFF to indicate if the AGC (automatic gain control) for uplink and downlink signaling is on or off.

PA

Shows the text ON or OFF to indicate if the PA power amplifier board for uplink and downlink signaling is on or off.

Band Selective Repeater

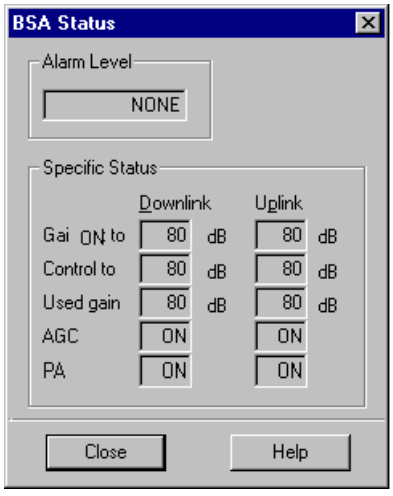


Figure 10-12. Band selective repeater status

The status window shows continuously updated operational status for the selected repeater.

The upper part of the window shows alarm, which is common information for the whole repeater.

The lower part of the window shows uplink and downlink operational status.

Field description:

Alarm Level

Shows the text NONE when there is no active alarm. The alarm level is shown if an alarm is active. Alarm and alarm levels are further detailed in the *Alarm Overview* section in Chapter 11.

Specific status

Gain set to

Uplink and downlink gain set in the configuration window (page 10-11).

Control to

This field shows the calculated uplink and downlink setpoint values based on the values in the *Gain set to* fields. Normally, they coincide with the *Gain set to* values.

Used gain

Actual momentary gain for the uplink and downlink transmission. This field shows clearly the automatic gain control at high downlink signal strength.

The momentary gain is controlled by the AGC (Automatic Gain Control). When the antenna isolation is good and the downlink signal strength is normal, the values coincide with the *Gain set to* value, but if instability due to poor antenna isolation is detected it decreases to a level 13dB below the lowest instability level. *Warning* alarm is activated when instability is detected and *Ceasing* when the instability has ceased.

The decreased gain level is kept for the next 60 minutes, whereupon it increases back to the *Gain set to* level.

If instability due to poor antenna isolation is detected at the lowest output gain, the PA board is switched off and PA OFF is indicated in the status window. *Error* alarm is activated when instability is detected and *Ceasing* when the instability has ceased.

Use the antenna isolation test to reveal isolation problems. See the text in the box on page 10-17.

AGC

Shows the text ON or OFF to indicate if the AGC (automatic gain control) for uplink and downlink signaling is on or off.

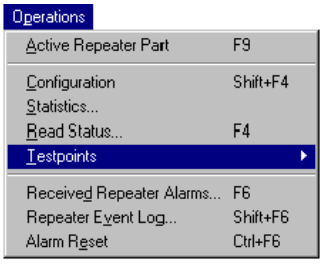
AGC is switched on/off by entering the BSA-AGC ON command or the BSA-AGC OFF command in the *Command Line Interface*. See the command list in the *Command Line Interface* section in Chapter 9.

PA

Shows the text ON or OFF to indicate if the PA power amplifier board for uplink and downlink signaling is on or off.

PA is switched on/off by entering the BSA-PAON ON command or the BSA-PAON OFF command in the Command Line Interface. See the command list in the *Command Line Interface* section in Chapter 9.

Testpoints



In the testpoints window you can read testpoint values essential for the operation.

The testpoint window is opened by clicking the testpoint button or by first selecting the **Testpoints** option in the **Operations** menu and then the **Boards (CHA/BSA/CSA/PA)** option, the **CU Board** option, or the **Modem** option depending on which testpoints you want to examine.

If you are connected to a combined channel/band selective repeater, then you can swap between channel selective active part and band selective active part (described on page 10-3).

Testpoint descriptions

Testpoint descriptions for the various repeater types are found on the following pages:

Channel selective CHA boards for GSM ..... page 10-26
Channel selective CSA/PA boards for CDMA 10-28
Band selective BSA/PA boards 10-30
CU board 10-32
Repeater modem 10-34

Channel Selective CHA Boards for GSM

Open the channel selective CHA board testpoint window by selecting the **Boards (CHA/BSA/CSA/PA)** option in the **Testpoints** submenu.

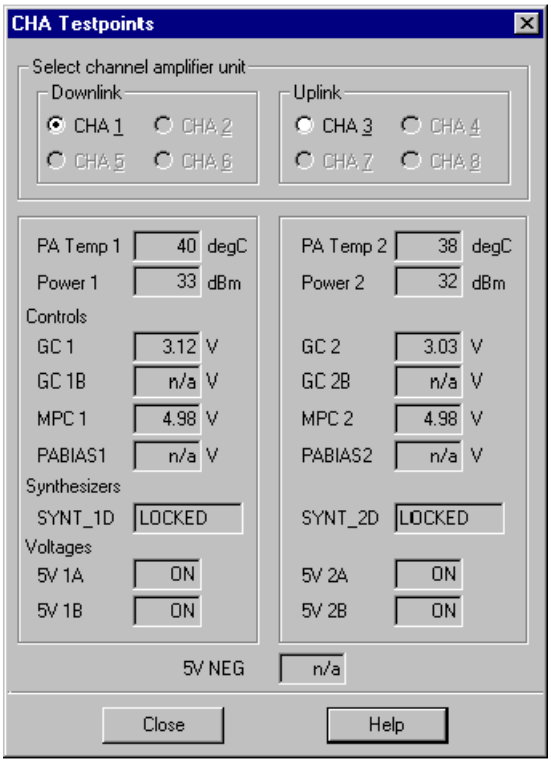


Figure 10-13. Testpoints, CHA boards

The testpoint window shows continuously updated measured values from the selected CHA board.

Select board by clicking a CHA board in the *Downlink* or *Uplink* frames.

The letters 'n/a' in a field stand for 'not available,' i.e. there is no such voltage on the board.

Field description:

Select channel amplifier unit

Downlink or uplink CHA board can be selected. Information about the two channels on the selected CHA board is shown in the two frames below.

PA Temp 1, PA Temp 2

Power amplifier temperature, which should be below +90°C.

Power 1, Power 2

Output power to the antenna. Should be within a range from 1dBm to 34dBm, or to a maximum level set by the system specifications.

GC 1, GC 2, GC 1B, GC 2B

Gain control voltage provided by the processor and fed to the control inputs of the two voltage controlled attenuators.

The voltage level can be between 0V and 5V.

MPC 1, MPC 2

Voltage levels applied to the max. output power control circuitry, a feature which limits the output power.

The voltage level can be between 0V and 5V.

PABIAS1, PABIAS2

Voltage levels applied to control the PA bias.

The voltage level can be between 0V and 5V.

SYNT_1D, SYNT_2D

These fields show the text LOCKED when the frequency synthesizers are locked, otherwise UNLOCKED.

If UNLOCKED is shown with stable text, the channel may be switched off and no fault has occurred.

If UNLOCKED is shown with flashing text, a fault has occurred.

5V 1A, 5V 1B, 5V 2A, 5V 2B

These fields show the text ON when the supply voltage is within the range, otherwise OFF.

If OFF is shown with stable text, the channel may be switched off and no fault has occurred.

If OFF/ON is shown with flashing text, a fault has occurred.

5V NEG

Shows the presence of negative 5V supply voltage.

Channel Selective CSA/PA Boards for CDMA

Open the channel selective CSA/PA board testpoint window by selecting the **Boards (CHA/BSA/CSA/PA)** option in the **Testpoints** submenu.

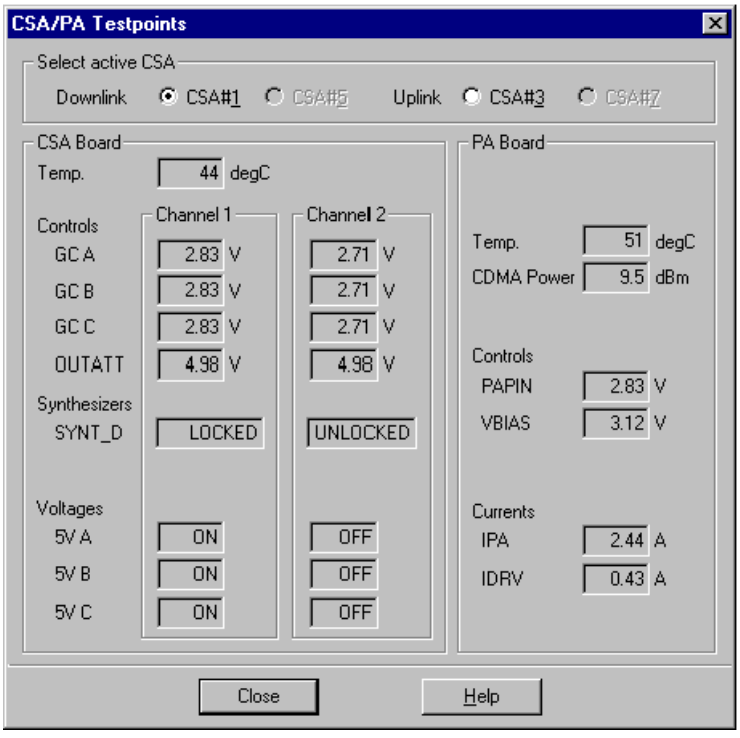


Figure 10-14. Testpoints, CSA/PA boards

The testpoint window shows continuously updated measured values from the selected CSA board and the corresponding PA board. Select board by clicking a CSA board in the *Select active CSA* section.

'n/a' in a field means that there is no such voltage on the board.

Field description:

Select active CSA

Downlink or uplink CSA board with corresponding PA board can be selected. Information about the two boards is shown in the two frames. Both the CSA board channels are shown (Channel 1 and Channel 2).

CSA Board

Temp.

The CSA board temperature, which should be below +90°C.

GC A, GC B, GC C

Gain control voltage provided by the processor and fed to the control inputs of the voltage controlled attenuators. The voltage level can be between 0V and 5V.

OUTATT

Control voltage provided by the processor and fed to the control input of an output attenuator. The voltage level can be between 0V and 5V.

SYNT_D

These fields show the text LOCKED when the frequency synthesizers are locked, otherwise UNLOCKED.

If UNLOCKED is shown with stable text, then the channel may be switched off and no fault has occurred.

If UNLOCKED is shown with flashing text, then a fault has occurred.

5V A, 5V B, 5V C

These fields show the text ON when the supply voltage is within the range, otherwise OFF.

If OFF is shown with stable text, the channel may be switched off and no fault has occurred.

If OFF/ON is shown with flashing text, a fault has occurred.

PA Board

Temp.

The PA board temperature, which should be below +90°C.

CDMA Power

Output power to the antenna. Should be within a range from 1dBm to 34dBm, or to a maximum level set by the system specifications.

PAPIN

Control voltage provided by the processor and fed to the control input of a PIN attenuator. The voltage level can be between 0V and 5V.

VBIAS

Bias voltage provided by the processor. The voltage level can be between 0V and 5V.

IPA

IPA stands for Amps Power Amplifier, i.e. the collector current in the output power amplifier push-pull stage. Typical current at low power is 0.4 - 0.5 Amp. and at high power 0.6 - 0.7 Amp.

IDRV

IDRV stands for Amps Driver, i.e. the driver amplifier current. Typical current at low power is 0.3 - 0.4 Amp. and at high power 0.6 - 0.7 Amp.

Band Selective BSA/PA Boards

Open the channel selective BSA/PA board testpoint window by selecting the **Boards (CHA/BSA/CSA/PA)** option in the **Testpoints** submenu.

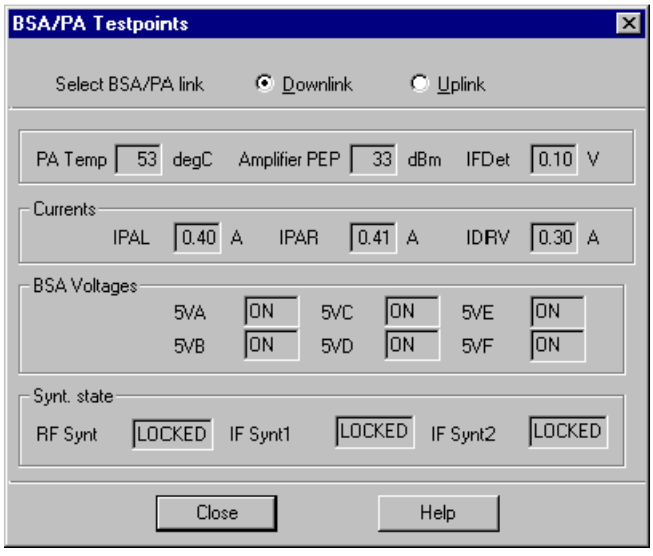


Figure 10-15. Testpoints, BSA/PA boards

The testpoint window shows continuously updated measured values from the selected BSA board and the corresponding PA board.

Select board by clicking *Downlink* or *Uplink* in the upper part of the window.

The letters 'n/a' in a field stand for 'not available,' i.e. there is no such voltage on the board.

Field description:

Select BSA/PA link

Downlink or uplink BSA board and corresponding PA board is selected by clicking one of these switches.

PA Temp

Power amplifier temperature. If the PA power amplifier board is switched off, this field is empty.

The temperature should be below +90°C.

Amplifier PEP

Output power from the PA stage in dBm_{PEP}. When the power level is less than 1dBm, '–' is shown.

Measurement range: $24dBm_{PEP}$ to $-34dBm_{PEP}$.

IFDet

IF detector voltage, which can be 0 - 2.5V, where higher voltage indicates higher IF signal, and vice versa.

Currents

IPAL, IPAR, IDRV

Collector currents in the output power amplifier push-pull stages measured in Amp.

Typical current at high and low power levels:

Current	Meaning	High power	Low power
IPAL	Amps PA Left	0.6 - 0.7 Amp.	0.4 - 0.5 Amp.
IPAR	Amps PA Right	0.6 - 0.7 Amp.	0.4 - 0.5 Amp.
IDRV	Amps Driver	0.4 - 0.5 Amp.	0.3 - 0.4 Amp.

BSA Voltages

5VA, 5VB, 5VC, 5VD, 5VE, 5VF

These fields show the text ON when the supply voltage is within an allowed range, otherwise OFF.

If OFF is shown with stable text, the BSA board may be switched off and no fault has occurred.

If OFF is shown with flashing text, a fault has occurred.

Synt. state

RF Synt, IF Synt1, IF Synt2

Shows the text LOCKED when the RF and IF synthesizers are locked, otherwise UNLOCKED.

If UNLOCKED is shown with stable text, the BSA board may be switched off and no fault has occurred.

If UNLOCKED is shown with flashing text, a fault has occurred.

CU Board

Open the CU board testpoint window by selecting the **CU Board** option in the **Testpoints** submenu.

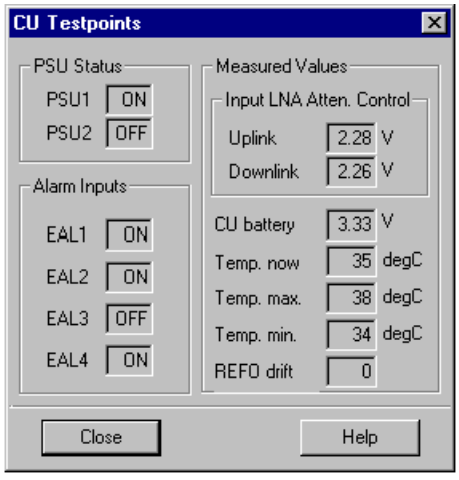


Figure 10-16. Testpoints, CU board

The CU board testpoint window shows continuously updated measured values from the CU board.

Field description:

PSU Status

PSU1, PSU2

On/off status for *PSU1* located in the cabinet, and *PSU2* located in the cover if the cover is equipped.

Alarm Inputs

EAL1, EAL2, EAL3, EAL4

The status for the four external alarm inputs. These alarm inputs are intended for external alarm detectors, e.g. relays, switches, etc.

The status is shown as follows:

- With steady text OFF for neither initiated nor activated alarms (and after *Ceasing*).
- With steady text ON for initiated but not activated alarms.
- With flashing text ON for activated alarms.

The EAL1 input can, alternatively, be used for a mains breakdown relay to indicate power supply failures.

The EAL2 input can, alternatively, be used for a battery backup unit to indicate battery backup faults.

The EAL3 input can, alternatively, be used for fiber optic alarm to indicate link errors between the repeater and the base station, if fiber optical link is used.

The EAL4 input can, alternatively, be used for a repeater door switch to indicate open repeater cover.

External alarms are assigned alarm levels in the *Alarm Configuration* window (see the *Alarm Configuration* section in Chapter 11).

The external alarm inputs EAL1 - EAL4 are further described in the *Alarm Overview* section in Chapter 11, *Alarms and Events*, and in the *P33 Alarm Port* section in Chapter 3, *OMT32 Installation*.

Measured Values

Input LNA Atten. Control

Gain control voltages attached to the uplink and downlink LNA antenna input low noise amplifiers.

Low voltage (<0.5VDC) means maximum LNA gain.

Voltage range: 0V - 5VDC.

CU battery

The CU board battery voltage used by the calendar clock and event log memory.

The battery voltage should be 2.7V - 3.5V.

Temp. now

Current CU board temperature in degrees Celsius.

Temp. max.

The highest measured CU board temperature since the last alarm reset. The temperature is shown in degrees Celsius.

This temperature is reset to the currently measured temperature when an alarm reset is performed. Alarm reset is described in Chapter 11, *Alarms and Events.*

Temp. min.

The same as *Temp. max.* but this is the lowest measured CU board temperature.

REFO drift

Shows a supervision count value for the reference oscillator (REFO) frequency counter.

The count value shall be within ±10.

Repeater Modem

Open the repeater modem testpoints window by selecting the **Modem** option in the **Testpoints** submenu.

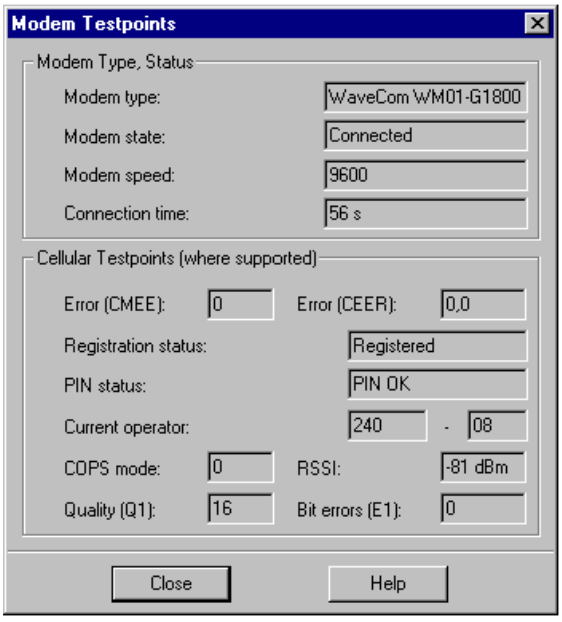


Figure 10-17. Testpoints, repeater modem

The repeater modem testpoint window shows continuously updated measured values from the repeater modem.

Field description:

Modem Type, Status

Modem type

Detected repeater modem type.

Modem state

The connection state for the repeater modem.

Modem speed

Modem transfer speed in bps (baud rate) between the modems at remote communication.

Connection time

Current remote connection time.

Cellular Testpoints (where supported)

Error (CMEE)
Error codes read from a cellular modem.

Error (CEER)
Error codes read from a cellular modem.

Registration status
Network registration.

PIN status
PIN code status, if used.

Current operator
MCC (country code) and MNC (network code) for the current network.

COPS mode
Shows whether an automatic or manual operator is selected.

RSSI
Received signal strength to the mobile phone.

Quality (Q1)
Shows a measured ETSI quality value. If there is no relevant quality value measured, then ’99’ is shown.

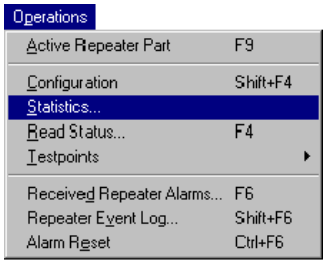
Bit errors (E1)
Shows a received ETSI bit error rate. If there is no relevant bit error value, then ’99’ is shown.

Traffic Statistics

The purpose of the statistics feature is to be able to set the RSSI threshold for uplink and downlink signaling, which is used as criteria for the statistics calculation in the repeater. The statistics can be shown by using the OMS (see the *Advanced Repeater OMS, User's Manual*).

In addition, alarms for no traffic and no broadcast channel can be set in the statistics feature.

The statistics feature can be used for channel selective GSM traffic only.



Open the statistics window by selecting the **Statistics** option in the **Operations** menu.

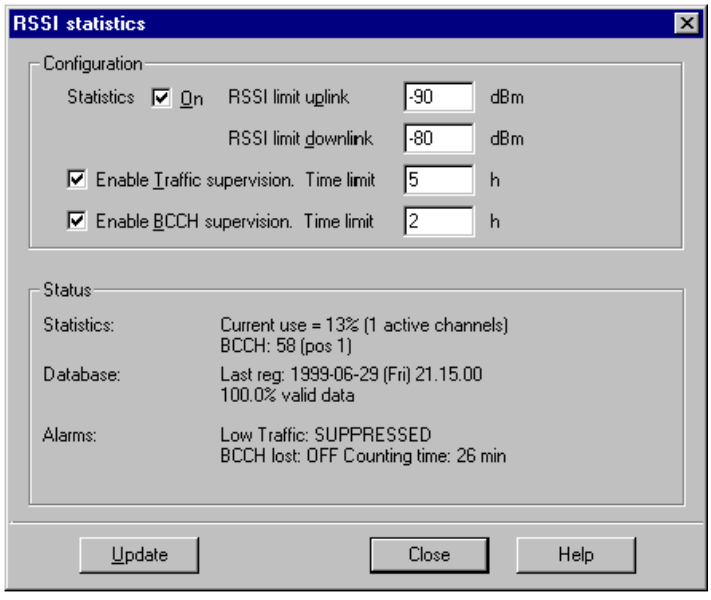


Figure 10-18. Traffic statistics

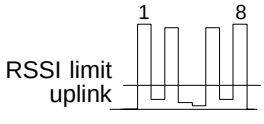
Field description:

Configuration

Statistics

The statistics function is on when this box is checked.

RSSI limit uplink



Sets the input signal strength (RSSI) threshold level for active uplink input time slots. The figure shows four active uplink time slots.

Further information about the time slot threshold level is found at the *Active time slots* field for channel selective GSM status (page 10-14).

Setting range: –100dBm to –40dBm.

RSSI limit downlink

Equal to the *RSSI limit uplink* but for the downlink path.

Traffic supervision

This feature generates an alarm if there is no traffic in any of the channels for a certain period.

In this field, you can set the length of this period in hours.

Setting range: 1 - 168 hours.

Traffic supervision is on when the check box is checked.

BCCH supervision

This feature generates an alarm if the repeater cannot find a broadcast control channel for a certain period.

In this field, you can set the length of this period (in hours).

Setting range: 1 - 168 hours.

BCCH supervision is on when the check box is checked.

Status

Statistics

Shows whether the statistics feature is on or off, current use, and active channels.

The second line shows if the repeater has found a BCCH and, in that case, in which channel it is found.

Database

Shows the last statistics reading, which is done every 15th minute.

The second line shows the percentage of relevant statistics in the database. E.g. if the repeater has been off half of the time, this line will display 50%.

Alarms

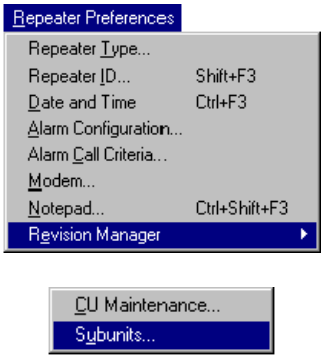
Shows *Low Traffic* and *BCCH lost* status.

ON = Alarms have been generated.

OFF = No alarm has been generated.

Repeater Boards (CHA/BSA/CSA/PA/RIA)

This feature shows the software and hardware version, the serial number and the manufacturing data for the repeater amplifier boards CHA, BSA, CSA and PA. Information for the R2R, *Repeater to Repeater Link* board, RIA, can also be shown.



Open the board selection dialog box by selecting the **Revision Manager** option in the **Repeater Preferences** menu and then the **Subunits** option.

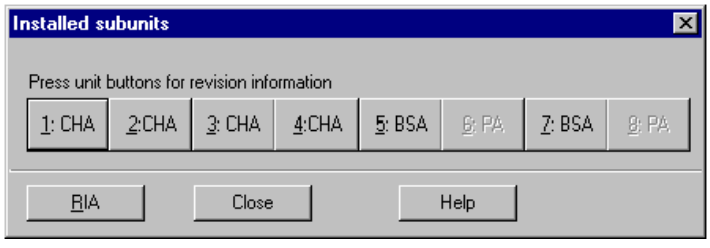


Figure 10-19. Repeater boards

Select board by clicking the corresponding button.

The following two examples show software and hardware information for a CHA amplifier board and a BSA amplifier board.

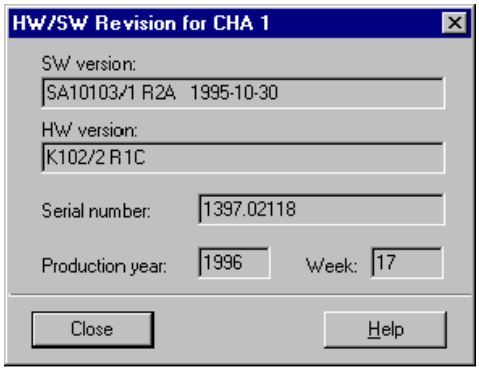


Figure 10-20. CHA board information

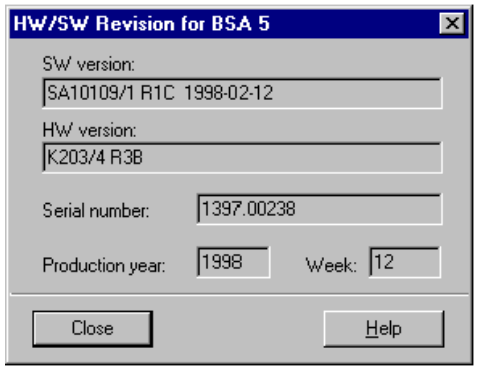
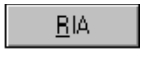


Figure 10-21. BSA board information



By clicking the **RIA** button, board information for the R2R, *Repeater to Repeater Link* board is shown, see Figure 10-22.

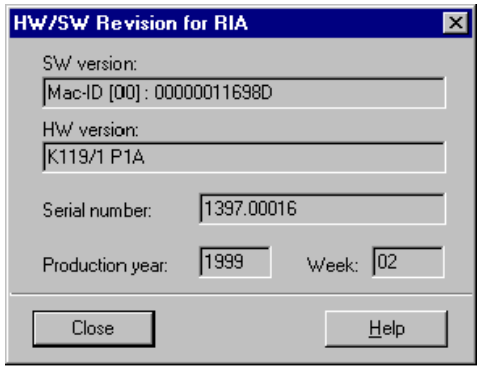


Figure 10-22. RIA board information

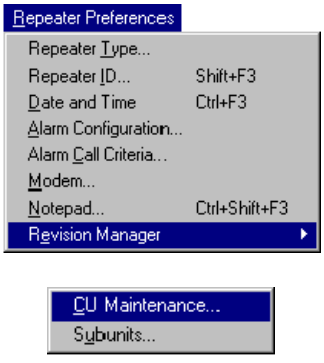
The *Repeater to Repeater Link* feature is described in Chapter 13, *Optional*.

Repeater Software Configuration

The purpose of this feature is to show the CU board software and hardware part numbers and revision status, and to give opportunity to download new CU software from OMT32, either locally or remotely via modem.

☞ *Do not update or reboot the CU software unless you are authorized and trained to download software to repeaters.*

CU Revision Manager



Open the *CU Revision Manager* dialog box by first selecting the **Revision Manager** option in the **Repeater Preferences** menu and then the **CU Maintenance** option.

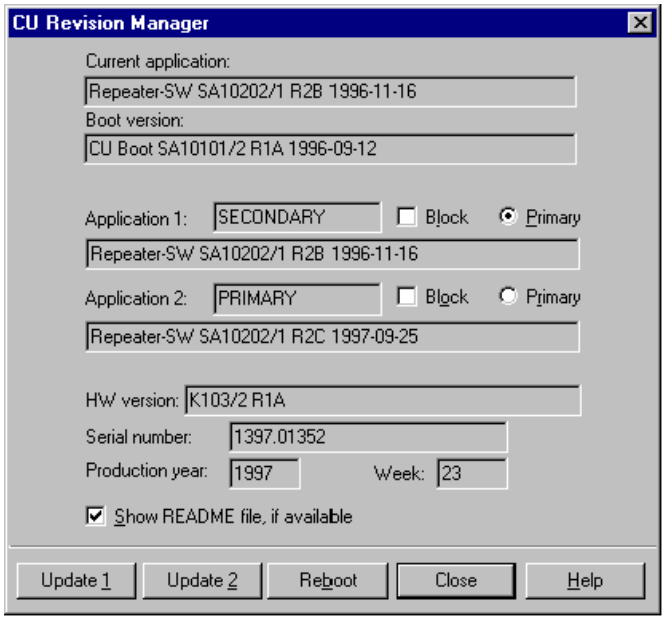
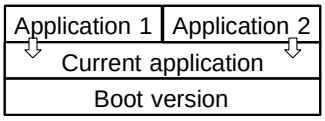


Figure 10-23. CU Revision Manager

The *CU Revision Manager* window shows part numbers and revision status for the current application, application 1, application 2, and the hardware.



Current application

Shows that application which the repeater is booted on.

Current application can be loaded from *Application 1* or *Application 2*.

Application 1

Application 1 is a CU software stored on the CU board. The repeater can be booted on this application, which then becomes the current application.

Application 2

Application 2 is a second CU software stored on the CU board which the repeater can be booted on.

Application 1 and Application 2 status

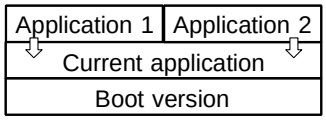
Application 1 and Application 2 can have the following status:

PRIMARY	The repeater is booted on the primary application at startup and on a reboot command with the *Reboot* button.
SECONDARY	The repeater is not booted on a secondary application but it can be selected to primary by clicking the *Primary* switch.
BLOCKED	A blocked application shall not be used. It is marked as blocked in the *Block* box.
SOFTBLOCKED	If an application crashes more than ten times then it is marked SOFTBLOCKED and cannot be used any more.
NOT EXISTING	This status means that there is no software stored in this application area.
ERROR	An error or interruption has occurred during an application downloading from OMT32 to the repeater CU board.

Show README file, if available

If you have the README.TXT release information file on the same disk as the new CU software when downloading it, this file is shown provided this box is checked (see page 10-43).

Rebooting



Rebooting means that the repeater is booted on the PRIMARY application, i.e. *Application 1* or *Application 2* which then becomes the *Current application*.

The reboot process can be initiated either locally or remotely via modem.

To reboot the repeater, perform the following procedure:

1. Ensure that the repeater will be rebooted on the right application. The PRIMARY application will be booted.

2. Click the **Reboot** button to launch the reboot procedure.

3. Confirm the reboot procedure, or cancel the reboot command if you do not want to continue:

Figure 10-24. Reboot start

4. You will be logged off when the reboot process is started. The following information is shown:

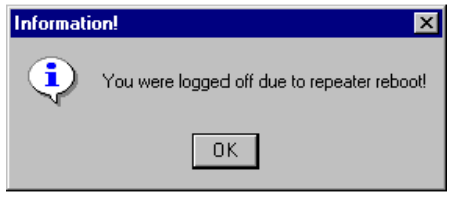
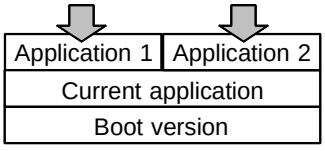


Figure 10-25. Reboot in progress

When the reboot process is completed the repeater runs that application which was set as PRIMARY.

Downloading CU Software



The purpose of this procedure is to get opportunity to download new software to the *Application 1* or *Application 2* area on the CU board.

After a following reboot, the downloaded application can be the *Current application*.

The download process can be performed either locally or remotely.

If incorrect software is downloaded, or the download process is interrupted, the repeater may be blocked and, in worst case, damaged. If this happens when the process is remotely controlled, a visit to the repeater site will be necessary. If the repeater is damaged, it might be necessary to replace the CU board.

Avoid downloading CU software to the primary area because an interrupted process will result in an incomplete CU software, on which the repeater will not be able to reboot.

Download the CU software as follows:

1. If the software to be downloaded is stored on a floppy disk, insert the disk in the disk drive.

2. Click the **Update 1** or **Update 2** button to download the software as *Application 1* or *Application 2* respectively.

3. Select software file to be downloaded:

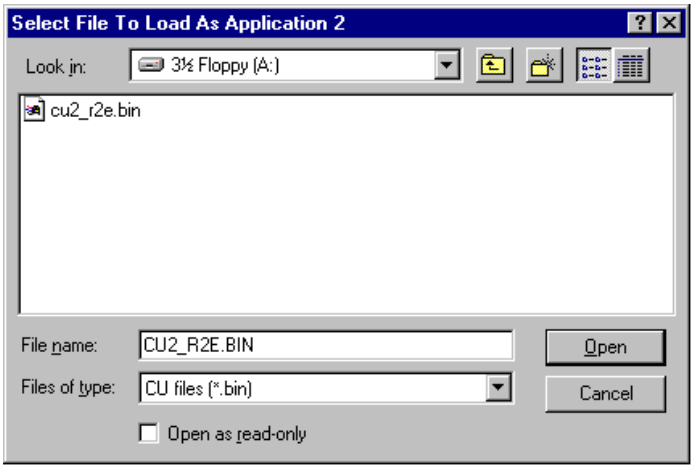


Figure 10-26. Select software file for downloading

If you have the README.TXT release information file on the same disk, this file is shown provided the *Show README file, if available* box is checked in the *CU Revision Manager* window (page 10-40).

Take this opportunity to read the release information carefully. If you do, you will probably get a lot of valuable information and perhaps save time an trouble.

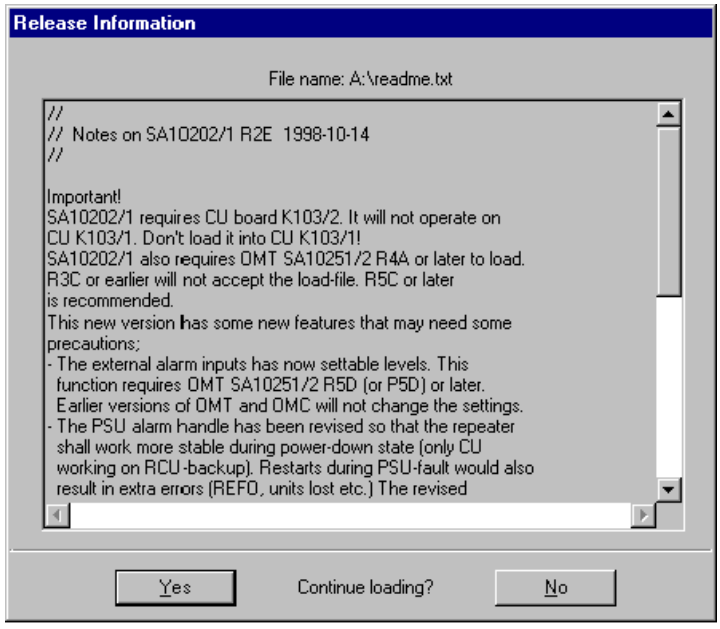
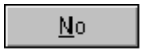
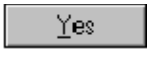


Figure 10-27. Release information



You may cancel the downloading command now by clicking the **NO** button.



If you want to continue downloading the CU software to the repeater, click the **Yes** button.

4. If you chose to continue, the OMT32 starts downloading the software to the repeater. The process is shown in the following box:

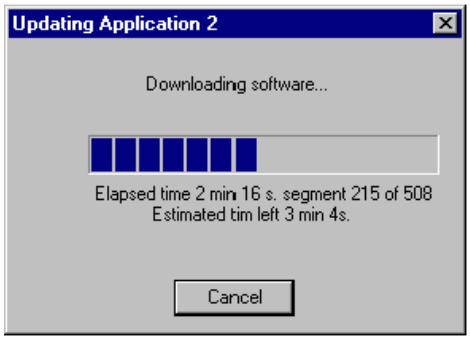


Figure 10-28. Downloading software to repeater

5. This box is shown when the download process is completed:

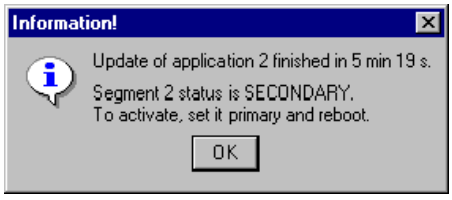
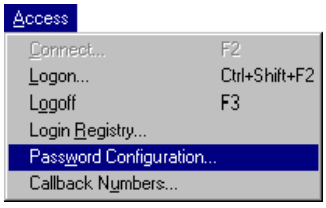


Figure 10-29. Downloading completed

If you want to start the repeater on the downloaded software, change the primary area in the *CU Revision Manager* (page 10-40) and reboot as described on page 10-42.

Password and Callback



Password and callback at logon can be configured by selecting the **Password Configuration** option in the **Access** menu.

To be able to open the password configuration dialog box, enter the current password in the following dialog box:

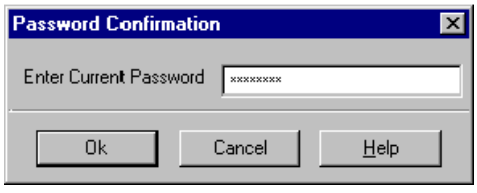


Figure 10-30. Password verification

After confirming the current password you can change the password level you are currently logged on with and lower levels. Make the changes in the following dialog box:

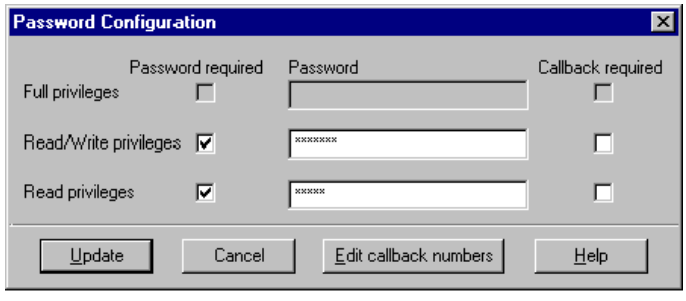


Figure 10-31. Password configuration

Full privileges

Full privileges is the highest password level with no limitations.

Read/Write privileges

The *Read/Write privileges* has the same privileges as *Full privileges* but password and callback for the *Full privileges* level cannot be changed.

Read privileges

The *Read privileges* means that no changes are allowed except for changing the *Read privileges* password and callback information.

Password required

Click this box to activate the password. Otherwise, it will not be in force.

Password

Type your password in this field. You can use from 1 up to 10 characters. Asterisks are shown when typing the password.

A grey box means that you have no authority to change, i.e. you have logged on OMT32 using a lower password level.

Callback required

Check this box to select callback, i.e. the repeater must call you back prior to logging on if you are remotely connected to the repeater.

☞ *Your phone number must be included in the 'Repeater Callback Numbers' list stored in the repeater, and in the 'Remote Connection Parameters' list stored in OMT32. Otherwise, the repeater will not be able to call you back.*

Edit callback numbers

Edit callback numbers

You can open the repeater callback phone number list either by clicking this button or by opening it from the **Access** menu (see page 10-48).

Update

Update

Click the **Update** button to enter the password.

Verify the new password by re-writing it in the following box:

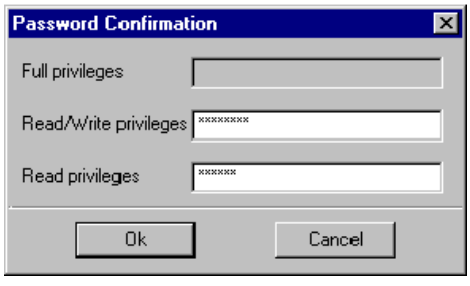


Figure 10-32. Password verification

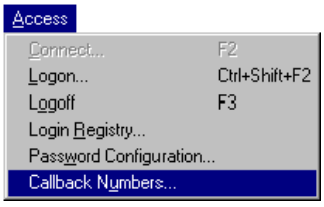
A grey box means that the password is not changed

Ok

Click **Ok** when ready.

The new password is now in force.

Callback Phone Numbers



The repeater callback phone number list contains those phone numbers which are to be used by the repeater when *Callback required* is selected in the *Password Configuration* dialog box (page 10-46).

The repeater callback phone number list is opened by selecting the **Callback Numbers** option in the **Access** menu.

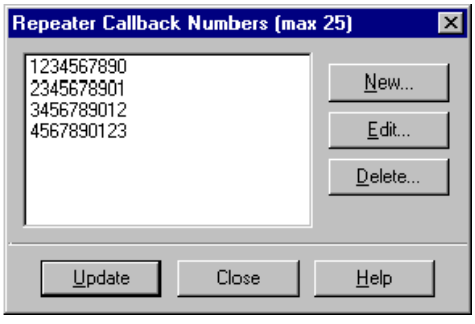


Figure 10-33. Repeater callback phone numbers

Phone numbers for callback passwords **must** be included in this list.

Maximum 25 phone numbers can be included.

The phone numbers in this list must correspond, character by character, to the phone numbers in the 'Remote Connection Parameters' list in OMT32 (see the 'Remote Connection' section in Chapter 9).

This is applicable to spaces as well. To be sure, type only numerals with no spaces or other characters. If the phone numbers do not correspond, character by character, then the repeater will not be able to call back. And, you will not be able to log on remotely and correct the number.

The following buttons are available if you are currently logged on with privileges to change the callback numbers.

New

Click this button to add a new phone number to the list.

Edit

Highlighted phone number can be edited after clicking this button.

Delete

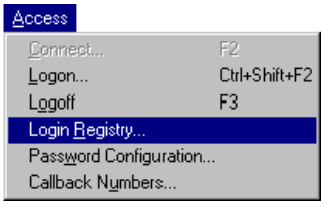
Highlighted phone number is deleted by clicking this button and confirming the deletion.

Update

Click the **Update** button to download the callback numbers to the repeater.

Login Registry

The purpose of the logon registry is to make it possible to see who have been logged on a specific repeater.



The login registry list is opened by selecting the **Login Registry** option in the **Access** menu.

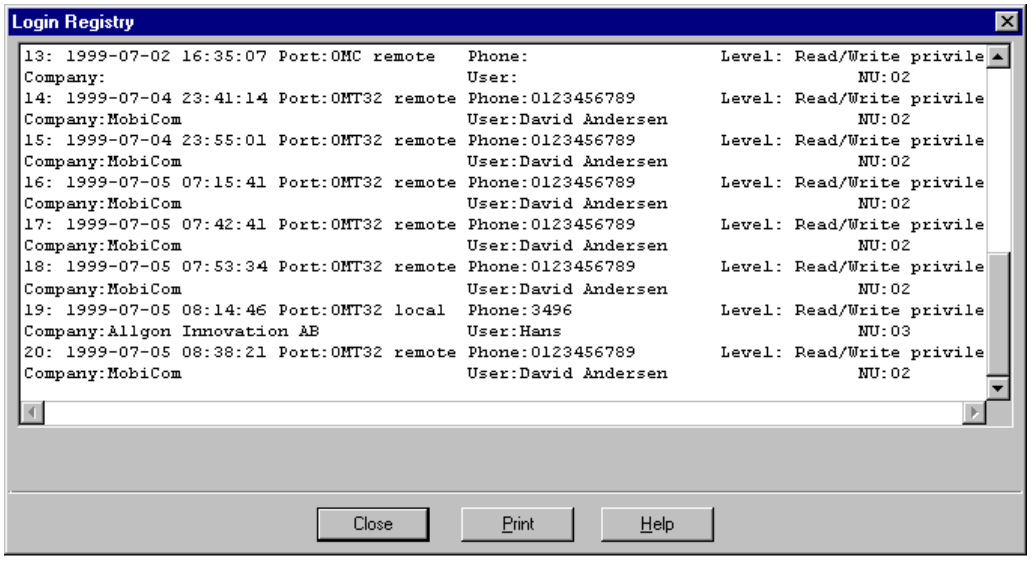
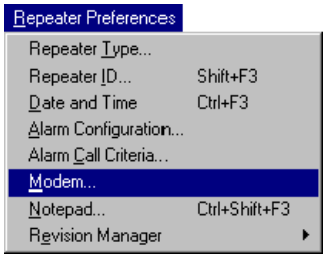


Figure 10-34. Logon registry

The latest 20 logon entries are included in the logon register.

By clicking the print button you can print out the entire logon register.

Repeater Modem Parameters



The command string, the PIN code to the repeater modem, and the modem transfer speed can be set in the following dialog box, which is opened by selecting the **Modem** option in the **Repeater Preferences** menu.

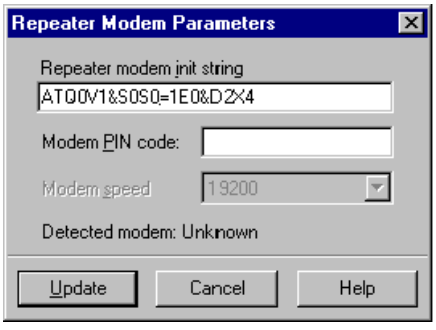


Figure 10-35. Repeater modem parameters

Repeater modem init string

In this field you can set the modem initiation string.

Be careful not to set an incorrect string at remote control of the repeater. A visit to the repeater site may be the result, and you will get no alarm call until a correct string has been entered. The default string should not be changed.

Modem PIN code

If a PIN code is to be used for the repeater mobile phone, enter the PIN code in this field. Otherwise, leave this field blank.

Modem speed

The modem transfer speed in bps (baud rate) for the repeater modem. Default value is 19200.

This field is available only when OMT32 is locally connected to a repeater.

Detected modem

Shows the modem type the repeater CU software has detected and recognized.

Update

Click the **Update** button to download the modem information to the repeater.

Modem Commands

To set the repeater modem in an adequate operational mode for the current configuration, an initiation string consisting of a number of modem commands have to be entered into the modem.

This initiation string is automatically generated by the CU board in the repeater, provided the repeater is equipped with the K103/2 type CU board (or a higher number).

For repeaters equipped with the K103/1 type CU board, the below detailed initiation string should be used as default.

Be aware of that the optional RCUs based on PCMCIA interfaces require different commands in the initiation string. Refer to the latest RCU installation guide available from your local Allgon representative.

Default modem initiation string

The default modem initiation string is: atq0v1s0=0e0x4

The string is limited to contain maximum 39 characters.

Indispensable commands

Q0	Return result codes.
V1	Display result codes as words.
&S0	Assert DSR signal always.

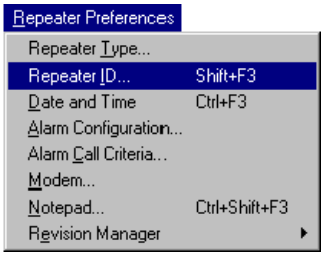
Recommended commands

E0	Do not echo characters sent to the modem.
S0=1	Answer on the first ring signal.
&D2	An ON-to-OFF transition of DTR signal causes a modem hang up.
X4	Provide basic call progress result codes, connection speed, and busy signal detection.

Commands to use if necessary

T	Dials using tone method.
P	Dials using pulse method.
&K3	Enable RTS/CTS local flow control. Recommended on line modem.

Repeater ID



This feature is used to set the repeater ID.

Select the **Repeater ID** option in the **Repeater Preferences** menu. The following dialog box is opened:

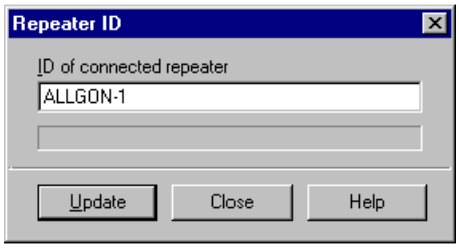


Figure 10-36. Repeater ID

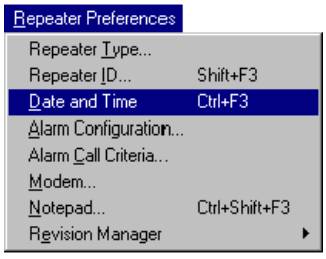
ID of connected repeater

Type the desired repeater ID in this field.

You can use maximum 32 characters.

Click the **Update** button to download the ID information to the repeater.

Repeater Date and Time



This feature is used to check or set the system real time clock in the repeater (on the CU board). The clock is used for date and time on alarms, etc.

To open the date and time dialog box, select the **Date and Time** option in the **Repeater Preferences** menu.

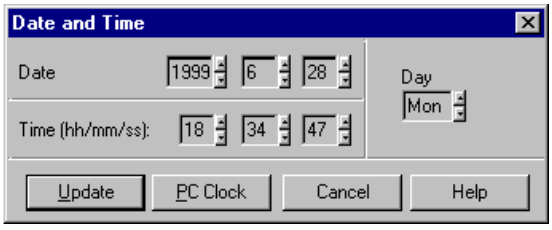


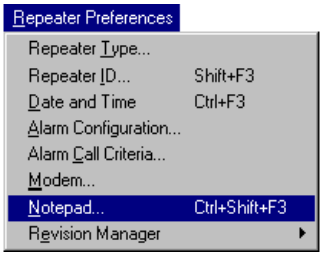
Figure 10-37. Date and time setting

Set time and date by clicking the up arrows or down arrows in the dialog box.

You can set the current date and time from the OMT32/PC clock by clicking the **PC Clock** button.

Click the **Update** button to download the settings to the repeater.

Notepad



The purpose of the repeater notepad is to get opportunity to store repeater related information, such as setting comments, maintenance and service information, etc. in the repeater which makes it available for operators and service personnel, locally or remotely connected.

Open the repeater notepad by selecting the **Notepad** option in the **Repeater Preferences** menu.

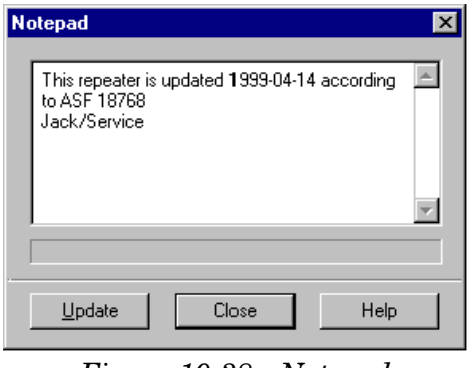
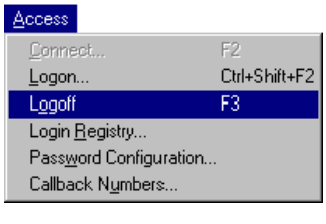


Figure 10-38. Notepad

Information saved in the Notepad is stored in an EEPROM. The information will thus remain after a power failure.

Logging Off

If you want to log off without leaving OMT32, click the logoff button or select the **Logoff** option in the **Access** menu.



Confirm the logoff in the dialog box:

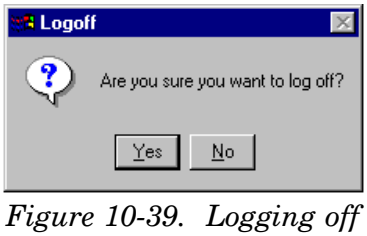


Figure 10-39. Logging off

11. Alarms and Events

In this chapter you will find descriptions on the following alarm and event features:

Alarms

- Alarm overview, page 11-2
- Alarm configuration, page 11-4
- Received repeater alarms, page 11-6
- Alarm reset, page 11-9
- Alarm call criteria, page 11-10

Events

- Repeater event log, page 11-12

Reference list

- Alarm list, page 11-14

Alarm Overview

Alarms are states or events in the repeaters that are more or less detrimental to the repeater function. All alarms are classified in the following levels depending on the extent of malfunction the alarms cause.

Alarm Levels

None

An event that is not detrimental to the repeater performance. *None* alarms will never be reported. If no alarm is active, *None* is indicated e.g. in the operational status window.

Warning

An alarm level that decreases the repeater performance somewhat. A *Warning* alarm is not a serious alarm. It can be caused by poor antenna isolation, low traffic activity, etc.

Error

An event indicating that a part of the repeater is not functioning. An *Error* alarm is a serious alarm. It can be caused by a synthesizer fault, external alarm, etc.

Critical

An event that makes the entire repeater cease to function. A *Critical* alarm is a very serious alarm. It can be caused by a mains breakdown, external alarm such as fire, etc.

Ceasing

An event that resets a previous alarm, i.e. the event when the cause of the alarm ceased. *Ceasing* is e.g. applicable to an antenna isolation alarm, which after some time can be ceased if poor antenna isolation is no longer detected.

Alarm indication

Alarms are indicated with a LED on the repeater front and can be transferred to a locally or remotely connected OMT32.

The alarm LED indication is reset by a power failure.

Combined repeaters indicate alarms for both the repeater units if an alarm has been activated in either of the units.

Internal and External Alarms

There are a number of internal alarms and four external alarm inputs.

The internal alarms have fixed alarm levels. They are listed on page 11-14.

The external alarm inputs, EAL1 - EAL4, can be configured for various alarm levels and alarm purposes in the *Alarm Configuration* window (description on page 11-4). Some of the alarm input purposes are described below.

EAL1

The EAL1 external alarm input can also be used for mains breakdown alarm. This is further detailed in the *Mains Breakdown Relay* section in Chapter 3.

EAL2

The EAL2 external alarm input can also be used for battery backup alarm.

EAL3

The EAL3 external alarm input can also be used for fiber optics alarm, provided the *Fiber Optic OMT* software is used.

EAL4

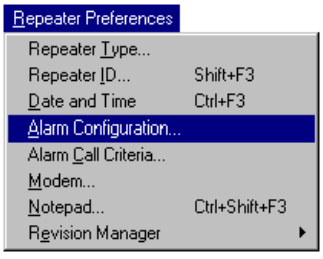
The EAL4 external alarm input can also be used for an alarm which is activated if the repeater door is open.

External alarm Ceasing

The external alarm inputs can be selected with or without *Ceasing*.

- With ceasing, e.g. *Warning w ceasing*, means that activated alarms as well as ceased alarms are reported to the OMT32. The latter as *Ceasing*.
- Without *Ceasing*, e.g. *Warning w/o ceasing*, means that an activated alarm will be reported to the OMT32. When the cause of the alarm has ceased, the event is assigned the *None* level.

Alarm Configuration



The external alarms EAL1 - EAL4, also described in the *P33 Alarm Port* section in Chapter 3, can be configured in a dialog box opened by selecting the **Alarm Configuration** option in the **Repeater Preferences** menu.

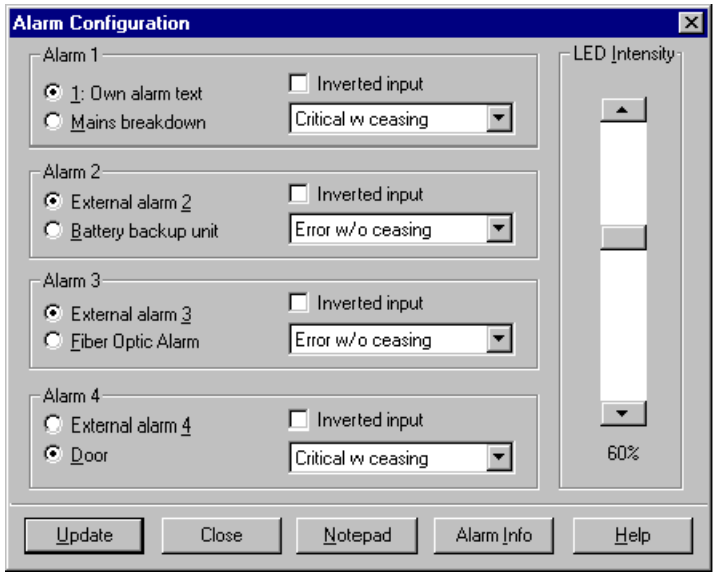


Figure 11-1. Alarm configuration

Click ▼ and select alarm level for each of the external alarm inputs 1 - 4. Available alarm levels are: *Critical*, *Error*, *Warning* and *None*. Each of which can be selected with or without *Ceasing*.

Select *None* for external alarms not used.

All alarms (except for the *Door* alarm) are activated 1 second after initiation.

Alarm 1

Select *External alarm 1* if you intend to use an external alarm sensor. You can choose any alarm level.

Select *Mains breakdown* to be able to alarm for power supply failure, if a mains breakdown relay (optional) is used. The alarm level is always set to *Critical w ceasing* in this case. The mains breakdown relay is detailed in the *Mains Breakdown Relay* section in Chapter 3.

Alarm 2

Select *External alarm 2* if you intend to use an external alarm sensor. You can choose any alarm level.

Select *Battery backup unit* to be able to alarm for battery backup failure, if backup battery unit (optional) is used. You can choose any alarm level. Note that *Alarm 1* cannot be be used if this option is selected.

Alarm 3

Select *External alarm 3* if you intend to use an external alarm sensor. You can choose any alarm level.

Select *Fiber Optic Alarm* to be able to alarm for link errors between the repeater and the base station, if fiber optical interface (optional) is used. You can choose any alarm level.

Alarm 4

Select *External alarm 4* if you intend to use an external alarm sensor. You can choose any alarm level.

Select *Door* to be able to alarm for open repeater door, if door switch (optional) is used. You can choose any alarm level. The door alarm is activated 30 seconds after initiation, i.e. the repeater cover can be opened for 30 seconds to turn the alarm off before the alarm is activated.

Inverted input

Checking this box toggles the alarm switch connection from being active closed to active open (see the *P33 Alarm Port* section in Chapter 3).

LED Intensity

The brightness of the led visible from the outside of the repeater. This feature makes it possible to reduce the brightness, e.g. to eliminate the risk of disturbance or misunderstanding when placed in subways, etc.

Buttons

Click the **Update** button to download the alarm settings to the repeater. The alarm status is shown in the *CU Testpoints* window (see *Testpoints* in Chapter 10).

Notepad opens the notepad in which you can read or write information which is then stored in the repeater (see *Notepad* in Chapter 10).

Alarm Info opens an alarm text box in which you can type your own external alarm texts. Click **Update** and **Close** after typing a new text.

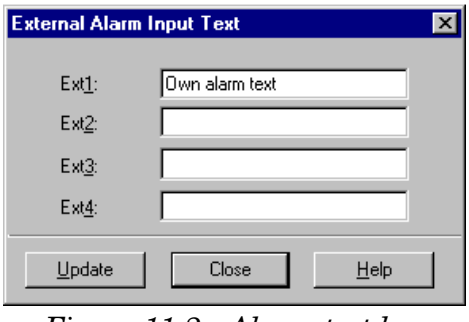
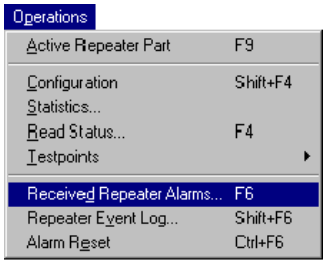


Figure 11-2. Alarm text box

Received Repeater Alarms

Critical, *Error* and *Warning* alarms can be sent automatically from a repeater to an OMT32 and then be stored in the OMT32/PC. These alarms can then be viewed in the *Received Repeater Alarms* window.

Open the Received Repeater Alarms window by clicking the received repeater alarms button, or by selecting the **Received Repeater Alarms** option in the **Operations** menu.



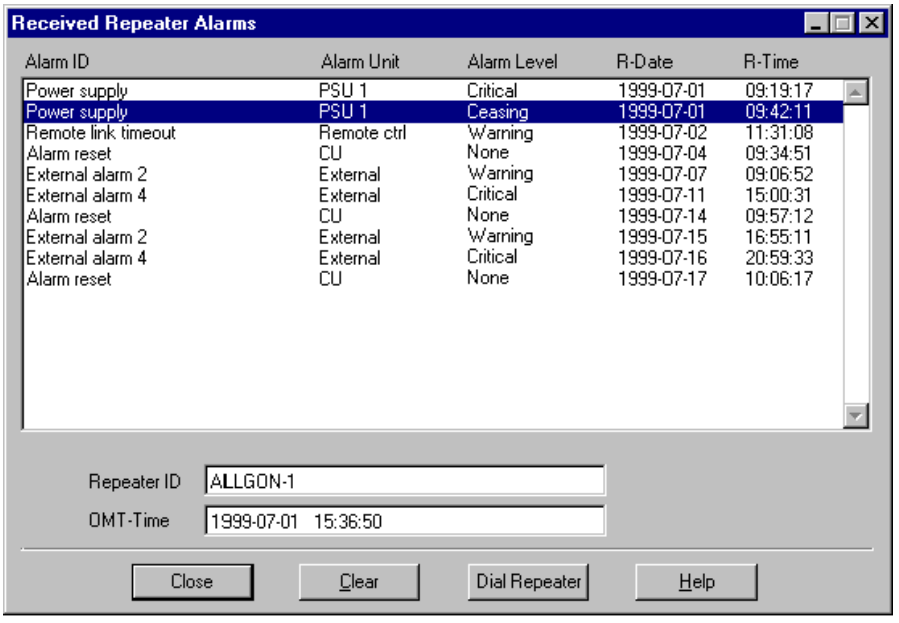


Figure 11-3. Received repeater alarms

All alarms of a certain alarm level and above are sent from the repeater to OMT32. You can set this threshold alarm level to *Critical*, *Error* or *Warning* by clicking the *Call on alarm level and above* switches in the *Alarm Call Criteria* window (page 11-10).

A total number of 200 alarms from several repeaters can be stored and viewed in this window.

The OMT32 alarm reception can be disabled/enabled. This is further detailed in the *Disabling/Enabling Remote Alarm Reception* section on page 11-8.

If the OMT32 alarm reception is disabled, or if no OMT32 for remote control is used, then activated alarms will be transferred to a locally connected OMT32 as soon as it is connected.

You can get an attention sound from the computer bell each time an alarm is received from a repeater. A description of how to do this is found in the *Sound at Repeater Alarm Reception* section in Chapter 6.

Alarm ID

Alarm text (a list of alarms is found under *Alarm Text* on page 11-14).

Alarm Unit

The unit in which the alarm is initiated (see under *Alarm Unit* in the alarm list on page 11-14).

Alarm Level

The levels of the alarms, i.e.: *Critical*, *Error*, *Warning*, *Ceasing* and *None* (see under *Alarm Level* in the alarm list on page 11-14).

Alarm levels are described in the *Alarm Overview* section on page 11-2.

R-Date, R-Time

Alarm activation date and time in the repeater ('R' stands for 'Repeater').

Repeater ID

The ID of the repeater from which the highlighted alarm is sent.

OMT-Time

Saving date and time in the OMT32/PC.

Clear

Clears the entire alarm list after you have confirmed the deletion in a dialog box.

Dial Repeater

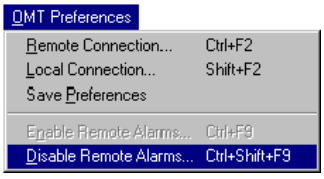
This button opens the dialog box for remote connection of a repeater (the same button as in the main menu button bar).

Disabling/Enabling Remote Alarm Reception

Alarm information can be sent from a repeater to a remote connected OMT32/PC, in which the alarm information is stored and can be displayed in the *Received Repeater Alarms* window (page 11-6).

The reception of the alarm information can be disabled/enabled.

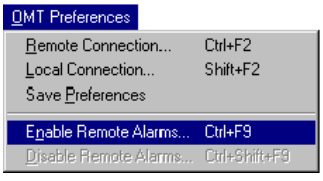
Disabling Remote Alarm Reception



To disable the reception, select the **Disable Remote Alarms** option in the **OMT Preferences** menu.

The **Disable Remote Alarms** option in the **OMT Preferences** menu will be shaded after this action, which indicates that the alarm reception is disabled.

Enabling Remote Alarm Reception



To enable the reception, select the **Enable Remote Alarms** option in the **OMT Preferences** menu.

The **Enable Remote Alarms** option in the **OMT Preferences** menu will be shaded after this action, which indicates that the alarm reception is enabled.

Alarm Reset

The following actions are performed when making an alarm reset:

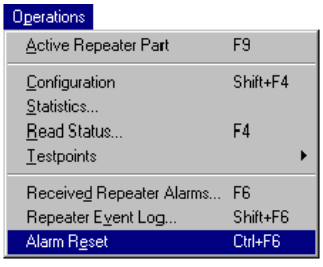
- All alarms are cleared in the repeater.
- All process counters are cleared.
- The highest value stored for the CU board temperature (*Temp. max.*) is reset to the currently measured temperature (the CU board is described in the *Testpoints* section in Chapter 10).
- Then, only remaining active alarms are considered as active alarms.

The reset procedure does not affect uplink or downlink communication in progress.

Alarm reset can be performed:

- by clicking the alarm reset button in the OMT32 main menu window.

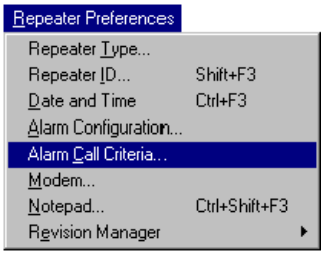
- by clicking the alarm reset button in the *Repeater Event Log* window (page 11-12).



- by selecting the **Alarm Reset** option in the **Operations** menu.

Alarm Call Criteria

Alarm information can be sent from a repeater to a remote connected OMT32/PC, in which the alarm information is stored and can be displayed in the *Received Repeater Alarms* window (page 11-6).



You can set phone numbers, time, and alarm levels for the alarm transmission from the repeater to the remote OMT32/PC in the following dialog box, which is opened by selecting the **Alarm Call Criteria** option in the **Repeater Preferences** menu.

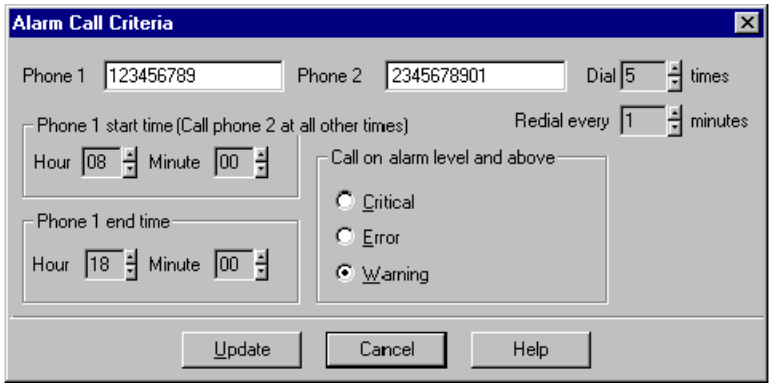


Figure 11-4. Alarm call criteria

Phone 1

The phone number to the primary OMT32 for alarm reception.

Phone 2

The phone number to a secondary OMT32 for alarm reception on other time than specified with the *Phone 1 start time* and *Phone 1 end time*.

In addition, this number is used as backup number in case of no answer on the primary number (see below).

Dial

The number of call attempts at busy or no answer.

Redial every

Time interval between the call attempts at busy or no answer.

Phone 1 start time, Phone 1 end time

Start and stop time for using the *Phone 1* number in hours and minutes.

Call on alarm level and above

Selected alarm level and higher are sent to the OMT32 and can be shown in the *Received Repeater Alarms* window (page 11-6).

If you click the *Error* option, then *Critical* and *Error* alarms will be sent from the repeater to the OMT32.

Examples of alarm calls within and outside the time interval for the *Phone 1*:

Busy or no answer within the 'Phone 1' time

1. The repeater calls the *Phone 1* number.
2. The repeater goes on calling the *Phone 1* number until the specified number of attempts in the *Dial* field is reached and waits as long as specified in the *Redial every* field between each attempt.
3. The repeater calls the *Phone 2* number.
4. The repeater goes on calling the *Phone 2* number until **twice** as many attempts as specified in the *Dial* field is reached and waits as long as specified in the *Redial every* field between each attempt.
5. The repeater stops calling.

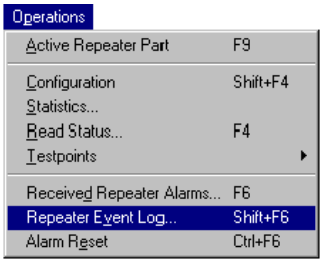
Busy or no answer outside the 'Phone 1' time

1. The repeater calls the *Phone 2* number.
2. The repeater goes on calling the *Phone 2* number until the specified number of attempts in the *Dial* field is reached and waits as long as specified in the *Redial every* field between each attempt.
3. Again, the repeater calls the *Phone 2* number.
4. The repeater goes on calling the *Phone 2* number until **twice** as many attempts as specified in the *Dial* field is reached and waits as long as specified in the *Redial every* field between each attempt.
5. The repeater stops calling.

Repeater Event Log

All alarms are logged and stored in the repeater. These can then be viewed in the *Repeater Event Log*.

The *Repeater Event Log* window is opened by clicking the repeater event log button, or by selecting the **Repeater Event Log** option in the **Operations** menu.



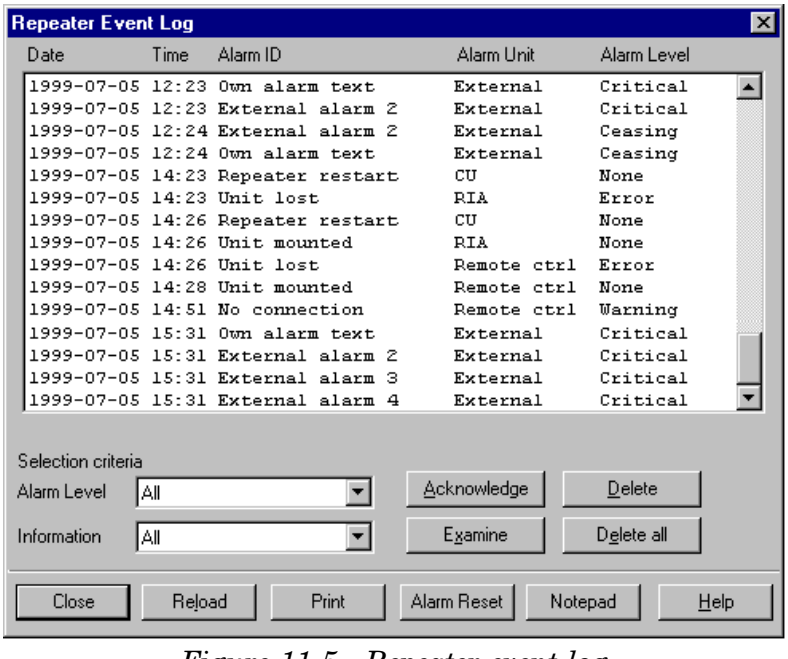


Figure 11-5. Repeater event log

The alarm log list contains the 80 latest alarms in time order. Most of the alarms which can be found in the event log are included in the alarm list on page 11-14.

Use the <up arrow>, <down arrow>, <PgUp>, <PgDn>, <Home>, and <End> keys or click the scroll bar to move in the list.

Date, Time

Date and time of the alarm activation.

Alarm ID

Alarm text (see the alarm list on page 11-14).

Alarm Unit

The unit in which the alarm is initiated.

Alarm Level

The alarm levels, which can be: *Critical*, *Error*, *Warning*, *Ceasing* or *None*.

Information

The following information text can be shown:

Sent	The alarm is sent to the OMT32 and is shown in the *Received Repeater Alarms* window (page 11-6).
Operator	The alarm is acknowledged by the operator with the **Acknowledge** button (see below).
Not acked	The alarm is either not yet sent or it has a too low alarm level to be sent (see *Call on alarm level and above* in the *Alarm Call Criteria* dialog box on page 11-10).

Selection criteria

Alarm Level

Selection criteria for the list. Click ▼ and select the alarm level to be shown, i.e.: *All*, *Critical*, *Error*, *Warning*, *Ceasing* or *None*.

Only entries with the selected alarm level are shown. All entries are shown if *All* is selected.

Selection criteria

Information

Selection criteria for the list. Click ▼ and select the management information to be listed, i.e.: *All*, *Sent*, *Operator* or *Not acked*.

Only entries with the selected management information are shown. All entries are shown when *All* is selected.

Buttons

Acknowledge — Click the **Acknowledge** button to acknowledge the highlighted alarm. The alarm will get the text *Operator* in the *Information* column.

Examine — Click the **Examine** button to get further information about the selected event.

Delete — The **Delete** button deletes the highlighted alarm without further confirmation.

Delete all — The **Delete all** button deletes the entire alarm log list after you have confirmed the deletion in a dialog box.

Reload — The **Reload** button updates the list from the repeater.

Print — This button prints out the entire contents of the *Repeater Event Log*.

Alarm Reset — Performs an alarm reset, i.e. updates the alarm information in the repeater. Alarm reset is described on page 11-9.

Notepad — Opens the repeater notepad in which you can read or write information which is stored in the repeater.

Alarm List

The following table contains the internal alarms which can occur and be shown in the *Repeater Event Log* alarm window (additional alarms may have been added to the system after issuing this manual).

Alarm Text	Alarm Unit	Alarm Level	Description
Antenna isolation	BSA # UL/DL	*Warning*	Poor antenna isolation
		Error	Poor antenna isolation at lowest gain
		Ceasing	The cause of the alarm has ceased
	Chan. # UL/DL	*Warning*	Poor antenna isolation
		Error	Poor antenna isolation at lowest gain
		Ceasing	The cause of the alarm has ceased
Alarm reset	CU	*None*	Manual alarm reset
Battery backup fault	External	*Error*	Battery backup fault
		Ceasing	The cause of the alarm has ceased
CU battery fault	CU	*Warning*	CU RAM battery fault
		Ceasing	The cause of the alarm has ceased
Door open alarm [1)]	External	Configurable	Door open more than 30 seconds
		Ceasing	Door closed more than 30 seconds or the alarm is disabled
EEPROM error	CU	*Error*	EEPROM read or write error
Ext REFO error	CU	*Warning*	An external reference is lost (e.g. GPS reference)
External alarm 1	External	Configurable	External alarm input 1 active more than 1 second
		Ceasing	External alarm input 1 no longer active
External alarm 2	External	Configurable	External alarm input 2 active more than 1 second
		Ceasing	External alarm input 2 no longer active
External alarm 3	External	Configurable	External alarm input 3 active more than 1 second
		Ceasing	External alarm input 3 no longer active
External alarm 4	External	Configurable	External alarm input 4 active more than 1 second
		Ceasing	External alarm input 4 no longer active
Fiber Optical error	External	Configurable	Fiber optic fault
		Ceasing	The cause of the alarm has ceased
Gain reduction	Chan. # UL/DL	*Warning*	The gain is reduced below the limit
		Ceasing	The cause of the alarm has ceased
High temperature	BSA # CHA # CSA #	*Warning*	The board temperature is higher than 85°C
		Error	The board temperature is higher than 95°C
		Ceasing	The board temperature has fallen below 70°C
	CU	*Warning*	The CU board temperature is higher than 90°C
		Ceasing	The CU board temperature has fallen below 90°C
Local bus error	BSA #	*Error*	Communication bus error on BSA board
	CHA #	*Error*	Communication bus error on CHA board
	CSA #	*Error*	Communication bus error on CSA board
Log cleared	CU	*None*	Log memory has been cleared
Log memory fault	CU	*Error*	Log memory fault
Logon failed	CU	*None*	Invalid repeater password
Low traffic activity	RSSI Statistics	*Warning*	No signal strength was above the limit set
		Ceasing	The cause of the alarm has ceased
Mains breakdown [2)]	External	*Critical*	Power failure
		Ceasing	Mains power is up again
Mains bkd w backup	External	*Error*	Mains breakdown - power from battery backup
		Ceasing	The cause of the alarm has ceased
Modem init failed	Remote ctrl	*None*	Initiation string to modem not OK

Alarm Text	Alarm Unit	Alarm Level	Description
No BCCH detected	RSSI Statistics	*Warning*	Signal strength on the BCCH channel was below the limit set
		Ceasing	The cause of the alarm has ceased
No connection	Remote ctrl	*None*	No connection at callback
		Warning	No connection at alarm calling
No modem found	Remote ctrl	*None*	No modem found
		Ceasing	Modem found
No phone detected	Remote ctrl	*Warning*	When using a PC-card modem together with the MS this alarm indicates contact with the PC-card modem but not with the MS. The MS may be turned off.
		Ceasing	The cause of the alarm has ceased
PA fault	BSA #	*Error*	Low power amplifier gain
	CHA #	*Error*	Low power amplifier gain
	CSA #	*Error*	Low power amplifier gain
Param. R/W error	BSA #	*Error*	EEPROM failure on the BSA board
	CHA #	*Error*	EEPROM failure on the CHA board
	CSA #	*Error*	EEPROM failure on the CSA board
Modem PIN failed	Remote ctrl	*Warning*	The PIN code sent tp MS is incorrect
		Ceasing	The cause of the alarm has ceased
Power supply	PSU1	*Critical*	Power failure in PSU1 (in the cabinet)
		Ceasing	PSU1 works properly again
	PSU2	*Critical*	Power failure in PSU2 (in the cover)
		Ceasing	PSU2 works properly again
PSU overvoltage	BSA #	*Critical*	The PA supply voltage is too high
REFO error	CU	*Error*	Significant REFO drift or error detected by CU
Remote connection	Remote ctrl	*None*	Remote connection to OMT32 via modem
Remote link timeout	Remote ctrl	*Warning*	Time limit of 20 min. exceeded without extending timer
Repeater restart	CU	*None*	Powering up by user or after power failure
		Warning	Software restart error 1st - 7th time
		Error	Software restart error 8th - 10th time
RF blocking	Chan. # UL	*Error*	Constant CW signal >27dBm. PA off.
		Ceasing	The cause of the alarm has ceased
RTC restarted	CU	*None*	The time is changed by the operator
		Warning	Date set to 1994-01-01
RTC error	CU	*Error*	RTC does not operate properly
Startup error	BSA #	*Error*	Hardware error on BSA board
	CHA #	*Error*	Hardware error on CHA board
	CSA #	*Error*	Hardware error on CSA board
SW load error	CU	*Error*	Software load error
Unsupported PA type	CSA #	*Error*	Mounted PA board ID is not expected by the BSA board
Synthesizer fault	BSA #	*Error*	Synthesizer unlocked on the BSA board
	CHA #	*Error*	Synthesizer unlocked on the CHA board
	CSA #	*Error*	Synthesizer unlocked on the CSA board
Volt Reg. fault	BSA #	*Error*	Missing DC voltage on the BSA board
	CHA #	*Error*	Missing DC voltage on the CHA board
	CSA #	*Error*	Missing DC voltage on the CSA board

Remarks

1) The *Door open alarm* requires an optional door switch described in the *P33 Alarm Port* section in Chapter 3.
2) The *Mains breakdown* alarm requires a relay not included in the repeater (see *Mains Breakdown Relay* in Chapter 3).

Chan. #, UL/DL Repeater channel number (1-4) at channel selective operation, uplink or downlink.
BSEL #, UL/DL Repeater channel number at band selective operation, uplink or downlink.
CHA # CHA board number at channel selective operation.
CSA # CSA board number at channel selective CDMA operation.
BSA # BSA board number at band selective operation.

12. Troubleshooting

This chapter contains the following sections:

- Active alarm, page 12-2
  What to do when an active alarm is generated
- Modem debug tools, page 12-4
  Fault tracing tools for troubleshooting the OMT modem and the repeater modem.
- R2R, communication problem, page 12-5
  Verification of the link communication speed.
- R2R, advanced node configuration, page 12-6
  Fault tracing tool for advanced troubleshooting.

Important

Before opening the repeater for service or repair, read carefully the entire Chapter 1, *Safety,* and *Outdoor Installation and Service Limitations* in Chapter 3.

Authorized personnel only are allowed to dismantle any part of the repeater at the site.

To open the repeater, use a 5mm Allen key (6mm for older repeaters).

Power Failure in General

As the entire parameter setting and channel information is stored in an EEPROM in the repeater, all parameter and channel information remains intact after a power failure or turn off.

Active Alarm

This section describes what to do when an active alarm is generated.

Power supply check

- Check the front LED to see if the repeater has power or not.
  If it has, go to the *Other faults* section below.
  If it has not, proceed with the *Power failure alarm* section.

Power failure alarm

- Check the mains outlet and the mains cable to the PSU.
- If the PSU has power but the repeater has not, the PSU is faulty.
- Replace the PSU as follows:

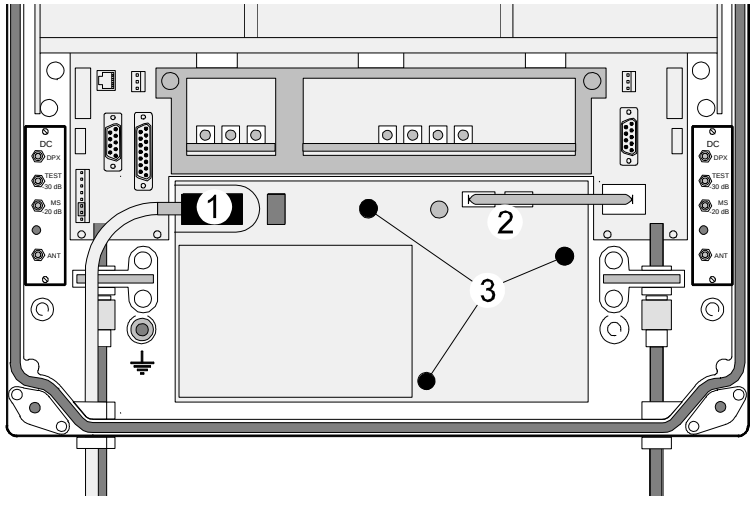


Figure 12-1. Replacing the PSU

1. Remove the mains plug ('1' in Figure 12-1) from the PSU.
2. Disconnect the two connectors (2) on the PSU.
3. Loosen the three fixing screws (3) using a 5mm Allen key.
4. Remove the PSU from the repeater and replace it.

Other faults

Open the repeater cover and connect an OMT32/PC to the repeater.

Open the *Repeater Event Log* and check the cause of the alarm.

- If an antenna isolation alarm is indicated, the antenna isolation should be measured. It should be 10dB - 15dB higher than the repeater gain. Check the antenna installation to ensure that nothing has happened to it. If there is a permanent degradation of the antenna isolation, lower the gain to 15dB below the measured antenna isolation.

  Make an alarm reset.

- If the alarm is activated by an external alarm input, then remove the cause of the alarm.

- If the alarm is indicated as *RF blocking*, then an external strong CW signal can be the cause of the alarm.

  The CW signal is described in the *Channel Selective GSM Repeater* section under *Operational Status* in Chapter 10.

- If a PSU alarm is activated which appears again, then the PSU should be replaced.

- If the alarm is internal and appears again, then a fault has probably occurred in the repeater. Try to trace which unit has activated the alarm and the type of the alarm. In most cases, the unit and fault type can be detected.

- As the last resort, if nothing else helps, remove the repeater for service.

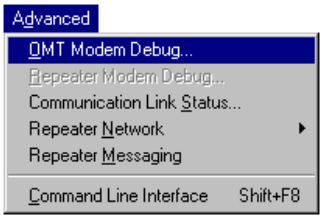
Modem Debug Tools

There are fault tracing tools for troubleshooting the OMT modem and the repeater modem included in the OMT32.

OMT32 Modem Debug Tool

To be able to use this tool, you need the OMT32/PC and a modem. The OMT32 cannot be connected to a repeater when using this tool.

Start up OMT32 and the modem.



Select the **OMT Modem Debug** option in the **Advanced** menu.

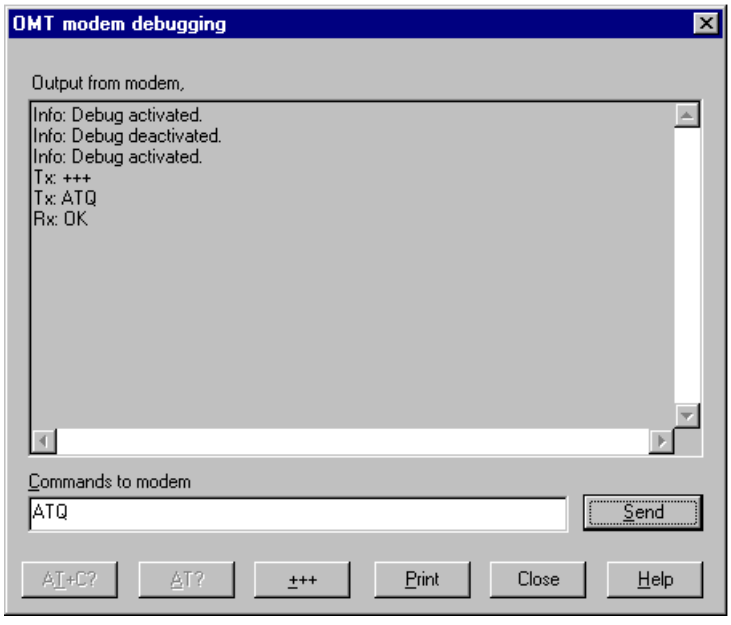


Figure 12-2. OMT modem debug tool

Modem commands can now be entered to the modem and the answers from the modem are shown in the box.

All commands and answers from the debug tool and the modem can be printed out by clicking the **Print** button.

Repeater Modem Debug Tool

A corresponding debug tool is available for the repeater modem as well.

To be able to use this tool, connect the repeater locally to the OMT32/PC and start up OMT32 and the repeater.

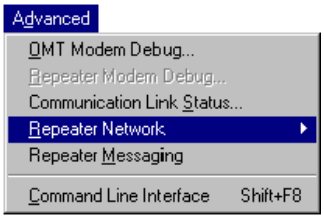
Start the debug tool by selecting the **Repeater Modem Debug** option in the **Advanced** menu.

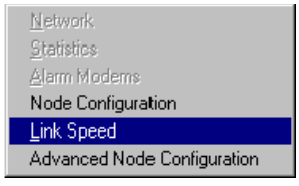
R2R, Communication Problem

A reason for communication problems in an R2R net can be a faulty link speed setting.

The data transfer speed must be the same for all repeaters in the R2R net. Set the speed to 38400 baud.

To be able to set the transfer speed, connect the repeater locally to the OMT32/PC and start up OMT32 and the repeater.





When the repeater and OMT32 is running, open the link speed dialog box by selecting the **Repeater Network** option in the **Advanced** menu, and then the **Link Speed** option.

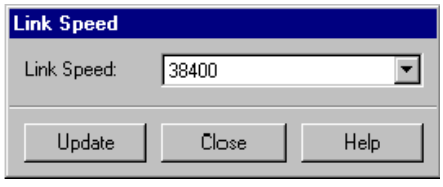


Figure 12-3. Data transfer speed

Verify the data transfer speed:

If the data transfer speed is 38400 baud, then click the **Close** button.

If the data transfer speed is anything else than 38400 baud, change to 38400 and click the **Update** button. The repeater must be restarted after this setting.

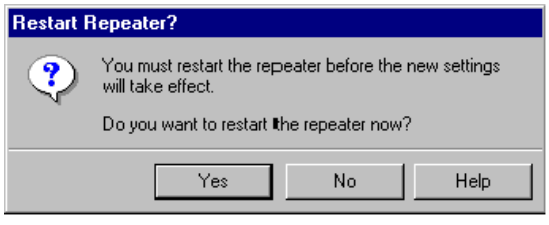


Figure 12-4. Repeater restart after setting

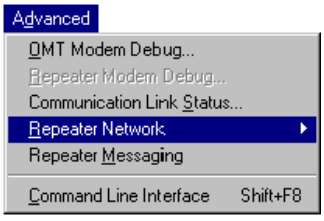
Click **Yes** to let the new setting take effect.

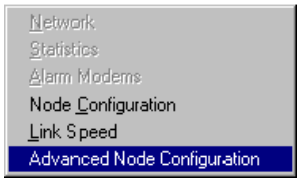
Repeat this procedure for those repeaters which have indicated problem.

R2R, Advanced Node Configuration

There is a fault tracing tool for advanced node configuration of the R2R net. This tool is included in the OMT32.

To be able to use this tool, connect the repeater locally to the OMT32/PC and start up OMT32 and the repeater.





When the repeater and OMT32 is running, open the link speed dialog box by selecting the **Repeater Network** option in the **Advanced** menu, and then the **Advanced Node Configuration** option.

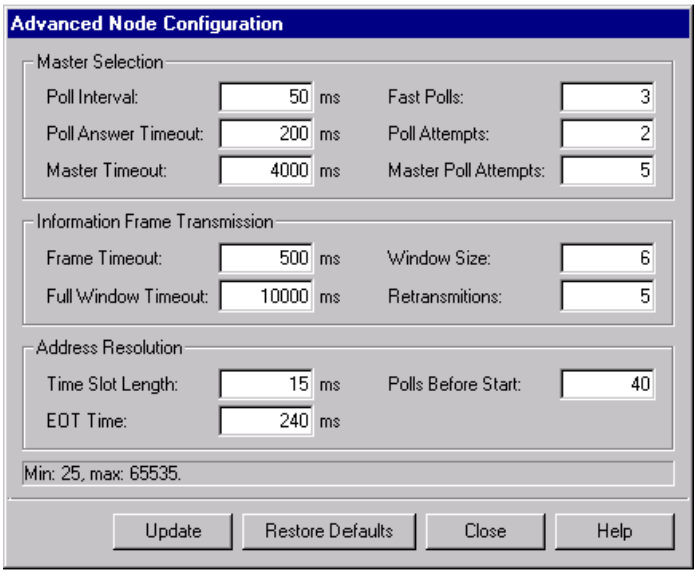


Figure 12-5. Advanced node configuration

The entries in this dialog box are not explained here because if you are not already familiar with the functions, you cannot use this tool.

The **Update** button enters the modifications made into the repeater.

The **Restore Defaults** button sets all parameters to the default settings.

13. Optional

This chapter describes the following optional accessories available for the Allgon repeaters:

- RCU, Remote Control Unit for GSM 900, page 13-2
- RCU, Remote Control Unit with PCMCIA Modem, page 13-4
- OMS, Operation and Maintenance System, page 13-8
- Traffic Statistics, page 13-8
- Battery Backup, page 13-8
- Fiber Optic Interface, page 13-8
- 7/16" Antenna Cable Connectors, page 13-8
- R2R, Repeater To Repeater Link, page 13-9

RCU, Remote Control Unit for GSM 900

As the mobile phone technology is developing very fast, this RCU may be modified after issuing this manual. New types may also have been added. For the latest details, please contact your local Allgon representative.

For remote control of Allgon repeaters in the GSM 900 system an RCU Remote Control Unit is available as a kit. This kit contains an integrated mobile phone/modem, power supply and power supply backup. A detailed installation guide is also included in the RCU kit.

The RCU for the GSM system is mounted inside the repeater cabinet, in front of the PSU (see Figure 13-1).

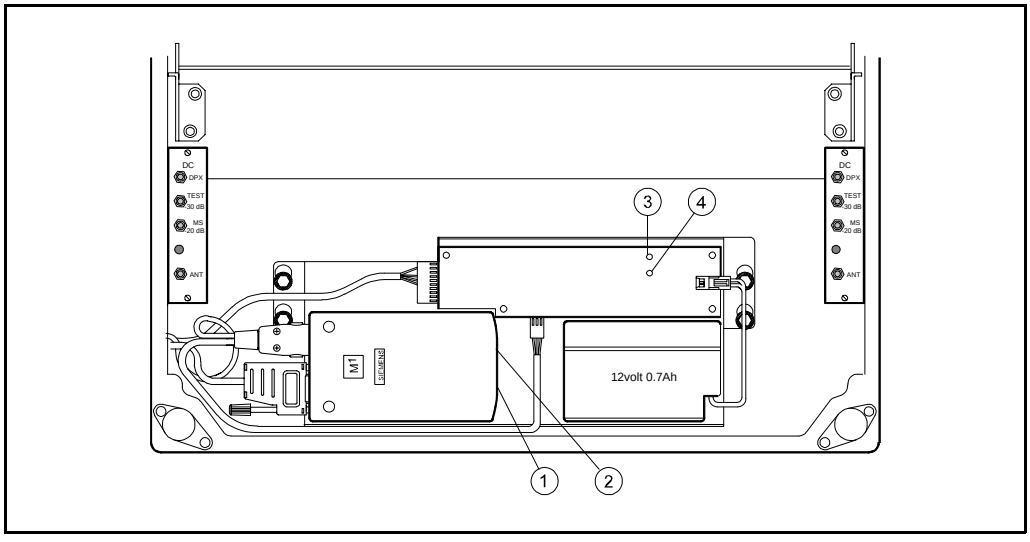


Figure 13-1. RCU - GSM 900 type

The RCU is connected to the P27, P32, and MS -20dB ports as described in the *Connection* section in Chapter 3.

RCU kit items

The item numbers refer to the numbers in Figure 13-1.

1. The GSM board. Press a pencil or similar object on the small button adjacent to the SIM board to release it.

2. LED indicator on the M1 phone/modem unit which shows three operational modes:

   Out: The unit is off

   Slow flashing: Stand by

   Fast flashing: Connection in progress

3. Green LED on the battery charger which is lit with a steady light when the power supply is OK, either from the mains or from the battery.

4. Yellow LED on the battery charger which is lit with a steady light during battery charge from the mains.

☞ *Do not forget to put a jumper between pin 2 and 3 on the P27 connector if you disconnect the RCU.*

GSM subscriber conditions

- Data transmission, 9600 bps (baud)
- Transparent mode
- If the PIN code have to be disabled, use another phone.

If you get problems with the PIN code, please contact Allgon Technical Support.

Power supply backup

If a power failure occurs, the backup battery has capacity to supply the CU, ALI and phone/modem for 30 minutes at room temperature and a limited number of call attempts.

The battery life is 1 - 2 years at normal indoor temperature. If the operational temperature is higher, the battery life is shortened.

Power supply battery type

12V, 0.7A/20h, lead, sealed, including cable and JST VHR-2N connector.

Part #	Allgon:	PM291 09/1
	Hitachi:	HP0.7-12P (VHR-2N)
	Yuasa:	NP0.8-12

RCU, Remote Control Unit with PCMCIA Modem

As the mobile phone technology is developing very fast, this RCU may be modified after issuing this manual. New types may also have been added. For the latest details, please contact your local Allgon representative.

For remote control of Allgon repeaters in various systems, two PCMCIA modem based RCU Remote Control Units are available as kits.

These are:

- RCU Kit for PCMCIA - Fixed Wire Line Connection
- RCU Kit for PCMCIA - Wireless Connection

These RCUs are basically two similars, but the Fixed Wire Line Connection kit does not include accessories for a mobile phone.

Detailed installation guides are included in the RCU kits.

RCU Kit for PCMCIA - Fixed Wire Line Connection

This kit contains a PCMCIA card host, power supply, and power supply backup.

Most Hayes compatible PCMCIA card modems (not included in the kit) can be used.

RCU Kit for PCMCIA - Wireless Connection

This kit contains a PCMCIA card host, power supply, power supply backup, mobile phone bracket, battery charger, charging cable, and mobile phone antenna cable.

The following mobile phones have been tested together with a DC23 type modem and are thus recommended by Allgon:

- Ericsson PH388 in DCS/PCN 1800MHz system
- Ericsson GH388 in GSM 1900MHz system

Power supply backup

If a power failure occurs, the included backup battery has capacity to supply the CU, ALI and the modem. For the Wireless Connection type, this is applicable provided the specified configuration of mobile phone and PCMCIA modem is used.

The battery life is 1 - 2 years at normal indoor temperature. If the operational temperature is higher, the battery life is shortened.

RCU for Fixed Wire Line Connection

The RCU for Fixed Wire Line Connection is mounted inside the repeater cabinet, in front of the PSU (see Figure 13-2).

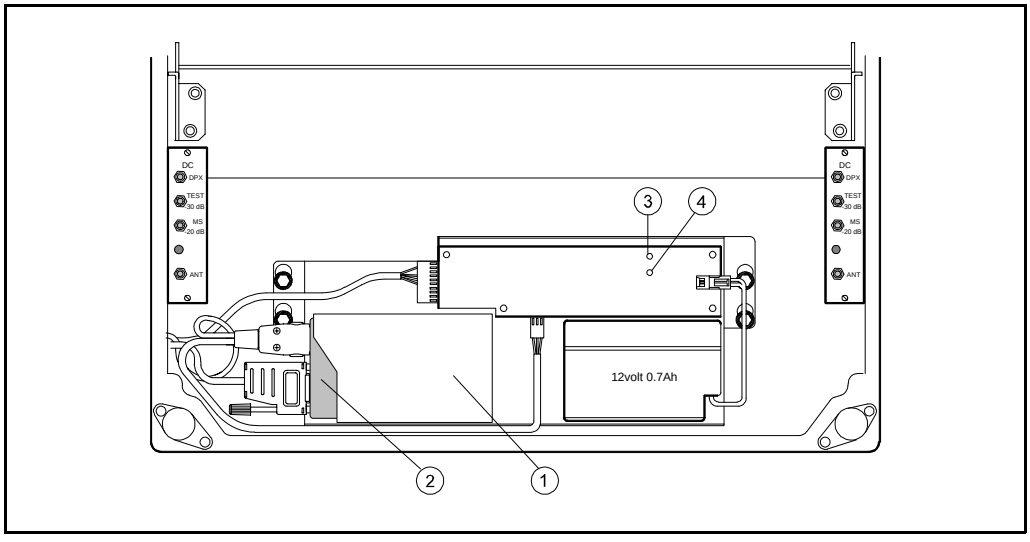


Figure 13-2. RCU - Fixed Wire Line PCMCIA type

The RCU is connected to the P27 and P32 ports as described in the *Connection* section in Chapter 3.

A free strain relief bushing at the bottom of the repeater is used for the external telephone line cable.

RCU kit items - Fixed Wire Line Connection

The item numbers refer to the numbers in Figure 13-2.

1. PCMCIA modem card host.

2. PCMCIA modem card (not included in the kit).

3. Green LED on the battery charger which is lit with a steady light when the power supply is OK, either from the mains or from the battery.

4. Yellow LED on the battery charger which is lit with a steady light during battery charge from the mains.

☞ *Do not forget to put a jumper between pin 2 and 3 on the P27 connector if you disconnect the RCU.*

RCU for Wireless Connection

The RCU base unit for Wireless Connection is mounted inside the repeater cabinet, in front of the PSU (see Figure 13-3).

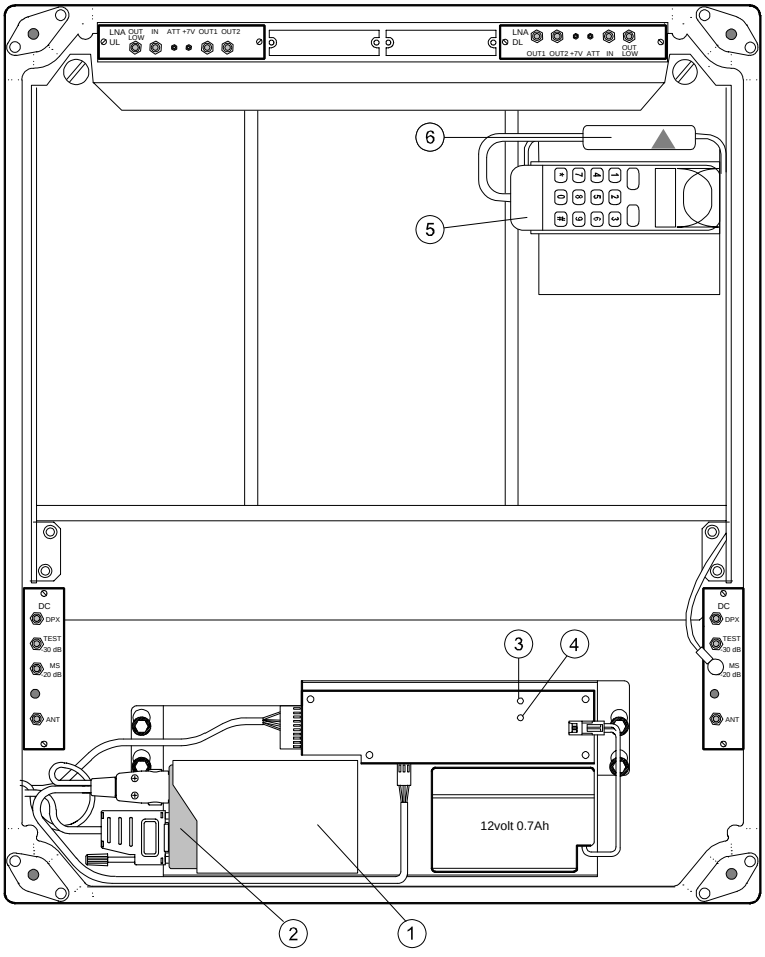


Figure 13-3. RCU - Wireless PCMCIA type

The bracket for the mobile phone is mounted in the upper right corner of the cabinet. The mobile phone is placed in the phone holder.

The RCU is connected to the P27 and P32 ports as described in the *Connection* section in Chapter 3.

The mobile phone antenna is connected to the MS -20dB port on the BS directional coupler (DC) located to the right in the cabinet.

The mobile battery charger is connected to the mobile phone.

RCU kit items - Wireless Connection

The item numbers refer to the numbers in Figure 13-3.

1. PCMCIA modem card host.
2. PCMCIA modem card (not included in the kit).
3. Green LED on the battery charger which is lit with a steady light when the power supply is OK, either from the mains or from the battery.
4. Yellow LED on the battery charger which is lit with a steady light during battery charge from the mains.
5. Mobile phone (not included in the kit) and the phone holder.
6. Battery charger with cable to the mobile phone.

☞ *Do not forget to put a jumper between pin 2 and 3 on the P27 connector if you disconnect the RCU.*

OMS, Operation and Maintenance System

The *OMS, Operation and Maintenance System* is an Allgon software package for controlling a large repeater fleet by using computers with Windows NT in networks with a common database.

The OMS is capable of operating a large number of repeaters. Multiple modems can be used for several incoming and outgoing parallel activities, such as polling, radio parameter configuration, software downloading, etc.

OMS is an improved OMC, *Operation and Maintenance Center*. The latter is replaced by the OMS and is no longer subject to further development.

Traffic Statistics

Traffic statistics is available for channel selective GSM 900, GSM 1900 and DCS/PCN 1800 repeaters, provided that the repeaters have the latest CU software versions, the latest CU and CHA boards, and that an OMS is used to poll and view the statistics.

Battery Backup

Battery backup can be arranged by completing the repeater with an Allgon UPS (Uninterruptible Power Supply). The Allgon UPS has an exterior similar to the repeater which means that it can preferably by mounted adjacent to the repeater.

Fiber Optic Interface

A *Fiber Optic Interface* that includes transmitter, receiver, alarm board and power supply is available for all the Allgon repeaters. The fiber optic interface can be adapted for separate uplink and downlink fiber as well as for bi-directional one-fiber distribution.

7/16" Antenna Cable Connectors

A 7/16" antenna cable kit is available for all the Allgon repeaters. This kit includes 7/16" antenna connectors for uplink and downlink antennas mounted on two repeater cable inlet flanges, and cables and connectors for connection to the DC directional couplers inside the repeater.

R2R, Repeater To Repeater Link

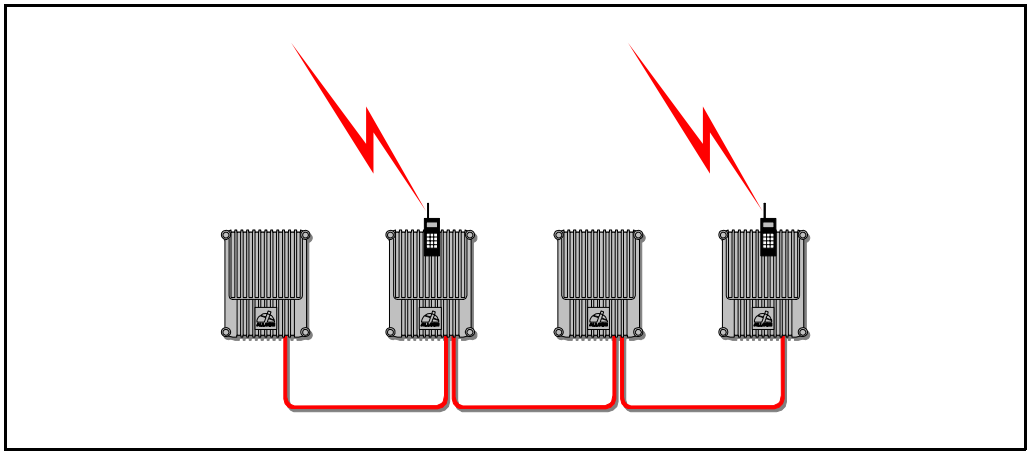


Figure 13-4. Repeater to Repeater Link

The Allgon *Repeater to Repeater Link* can be used in order to establish a repeater network with up to 13 repeaters, one or several of which can contain a phone line for communication with an OMT32 or an OMS.

Channel selective repeaters as well as band selective repeaters can be included and mixed in the network.

Repeaters can either be equipped with this feature at the delivery from Allgon, or be completed with a *Repeater to Repeater Link Kit*, provided the repeaters meet the following requirements.

Requirements

To be able to use the *Repeater to Repeater Link* feature, the following DIA board, CU board and CU software is required:

DIA board	K105/1 version R2A or higher
CU board	K103/2 version R1A or higher
CU software	SA102 02/1 version R3A or higher

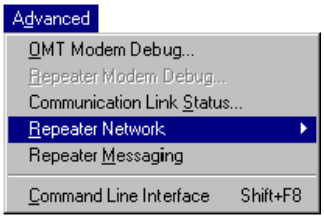
Further information and requirements are found in the R2R installation document, *R2R, Repeater to Repeater Link Kit, Installation Guide* (part # VD202 91/EN).

R2R Installation

The R2R, *Repeater to Repeater Link* is installed as described in the *R2R, Repeater to Repeater Link Kit, Installation Guide*.

Node Configuration

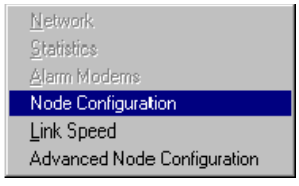
The node configuration made at the installation can be changed.



To be able to change the node configuration, connect to the repeater locally with an OMT32/PC.

Log on the repeater.

Select the **Repeater Network** option in the **Advanced** menu, and then the **Node Configuration** option.



Set the node identity and the *Control Station* in the following dialog box:

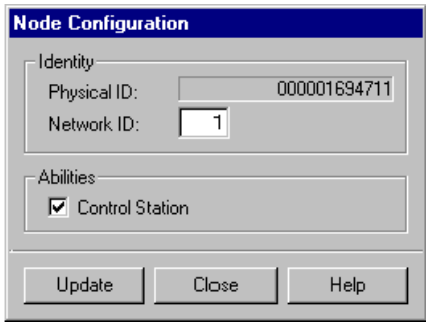


Figure 13-5. Node configuration

Set the *Network ID* to a unique number between 1 and 13 for the current repeater.

Check the *Control Station* box if the current repeater can handle the communication and thus be a master repeater in the net. Several repeaters in the same net can be selected to be *Control Stations*, which means that the next selected repeater becomes the master if the previous master of some reason has ceased to be i operation.

At least one repeater has to be selected as Control Station in an R2R net. It is recommended to select all repeaters in the net as Control Stations, except for fiber optic slave repeaters.

When ready, click the **Update** button.

Now, the repeater has to reboot to set the configuration in effect. The following dialog box is shown:

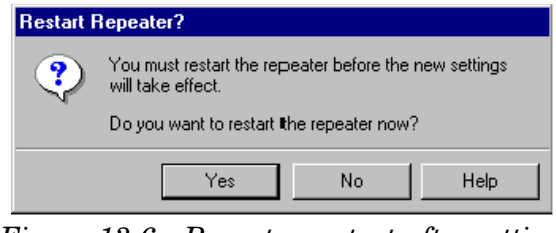
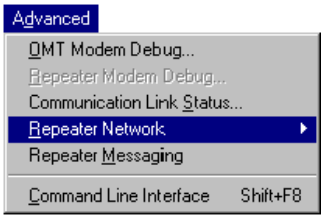
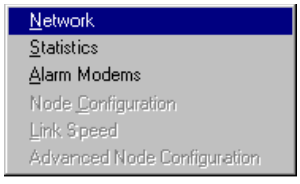


Figure 13-6. Repeater restart after setting

Network Settings

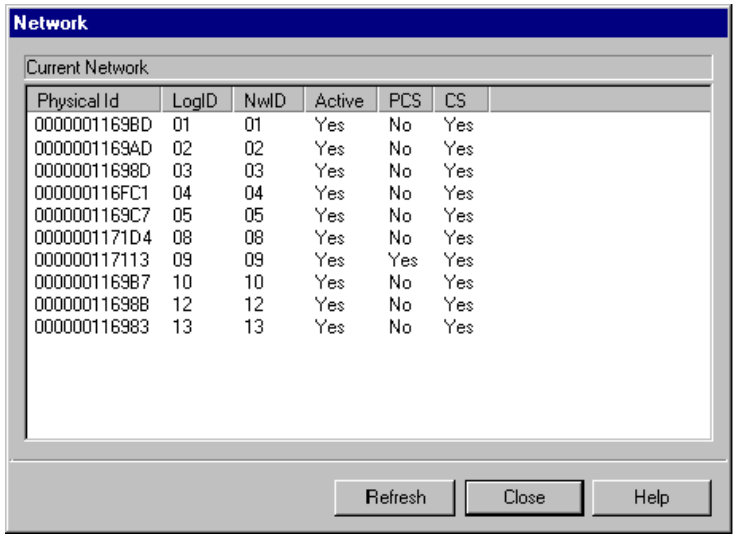
The R2R settings can be shown in an information box.





To view the network information box, select the **Repeater Network** option in the **Advanced** menu, and then the **Network** option.

The following information box is shown:



Physical Id	LogID	NwID	Active	PCS	CS
0000001169BD	01	01	Yes	No	Yes
0000001169AD	02	02	Yes	No	Yes
00000011698D	03	03	Yes	No	Yes
000000116FC1	04	04	Yes	No	Yes
0000001169C7	05	05	Yes	No	Yes
0000001171D4	08	08	Yes	No	Yes
000000117113	09	09	Yes	Yes	Yes
0000001169B7	10	10	Yes	No	Yes
00000011698B	12	12	Yes	No	Yes
000000116983	13	13	Yes	No	Yes

Figure 13-7. R2R network settings

In addition to the physical and logical IDs, this box shows:

NwID Network ID, selected at the node configuration.

Active 'Yes' means that the repeater is in operation.

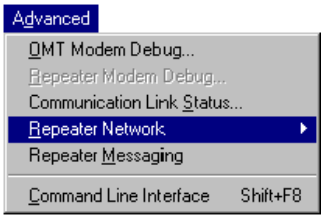
PCS 'Yes' means that the repeater is currently the master and handles the alarm communication.

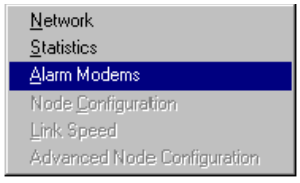
CS 'Yes' means that the repeater is set as *Control Station* and can thus be the master.

No modification can be made in this box.

Alarm Configuration

This configuration sets the modems to be used by the repeaters in the net for alarm reporting to OMT32.





Open the configuration box by selecting the **Repeater Network** option in the **Advanced** menu, and then the **Alarm Modems** option.

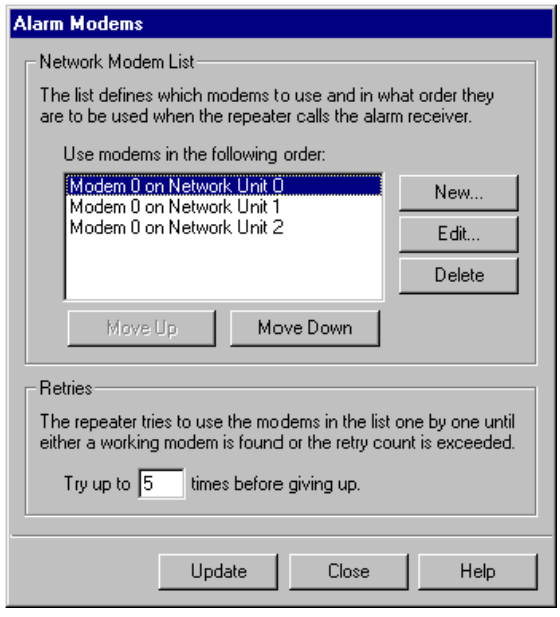


Figure 13-8. Alarm configuration

To make the explanation easy, assume that you are logged on repeater NU 0 (NU = network unit), which can be seen in Figure 13-8 and in Figure 13-10. If this repeater is to use repeater NU 1 and NU 2 when the own communication fails, then these network units are added to the list in Figure 13-8.

Now, the list contains three repeaters, NU 0, NU 1 and NU 2.

The 'Try up to' box sets the number of attempts to report an alarm before giving up.

The settings in Figure 13-8 will, if busy line or no answer, result in the following call attempt cycle before giving up:

NU 0 - NU 1 - NU 2 - NU 0 - NU 1 - giving up.

This makes 5 attempts in the order set in the table.

The cycle order can be changed by selecting a network unit and clicking the **Move Up** or **Move Down** buttons.

Modem 0 means the first modem for the repeater, but no repeater can handle more than one modem, so Modem must always be set to 0.

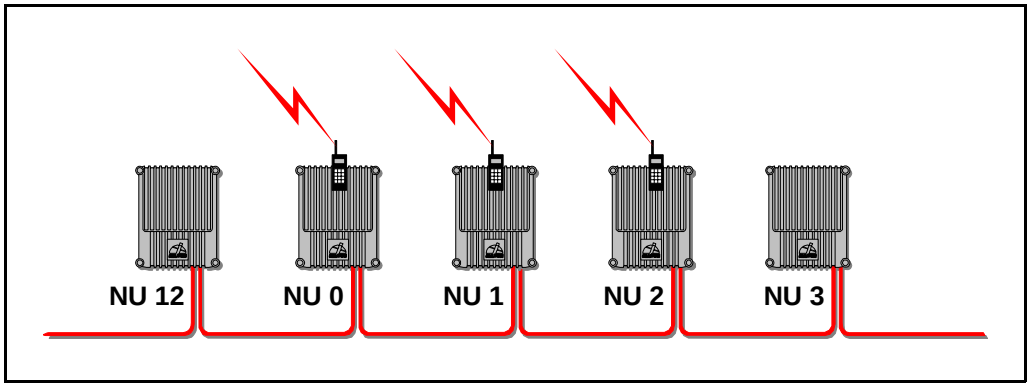


Figure 13-10. Three repeaters for communication

You can insert, edit and delete network units in the list by clicking the buttons. The following box is an example on how to add repeater NU 2 to the list.

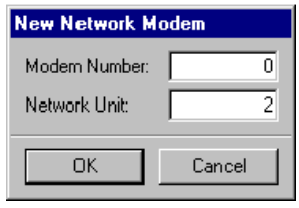
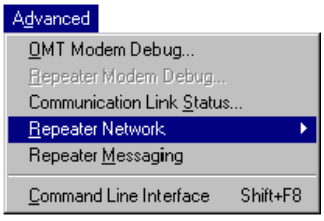


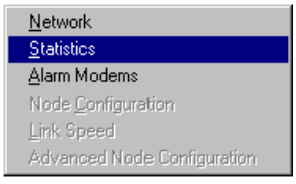
Figure 13-9. Adding repeater

When ready, click the **Update** button to enter the settings to the repeater.

Network Statistics

Available R2R statistics can be shown in an information box.





To view the statistics, select the **Repeater Network** option in the **Advanced** menu, and then the **Statistics** option.

The following statistics box is shown:

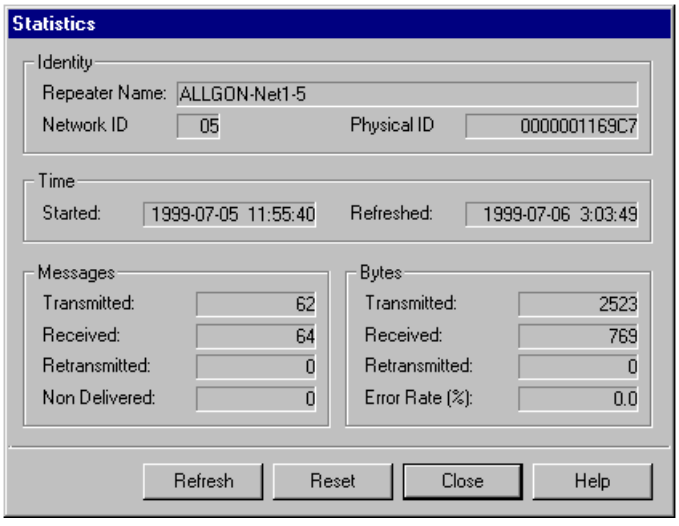


Figure 13-11. R2R network statistics

The statistics box shows both messages and bytes transmitted. The statistics calculation can be reset by clicking the **Reset** button.

RIA Board Version

The version of the link communication RIA board (Repeater to Repeater Interface Adapter) can be detected remotely by OMT32.

See the *Repeater Boards (CHA/BSA/CSA/PA/RIA)* section in Chapter 10.

Troubleshooting

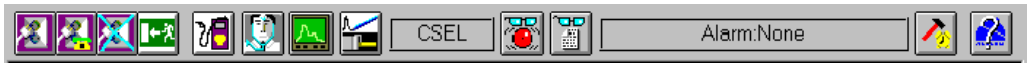
The following procedures are fault tracing tools and are thus found in Chapter 12, *Troubleshooting:*

- Link speed setting
- Advanced node configuration

Appendix A - Menu Reference Guide

In this Appendix you will find descriptions of the main window button bar and the main window menu.

Main Window Button Bar



Main window button functions:

Local connection - see the *Access* menu on page A-3.

Remote connection - see the Access menu on page A-3.

Logoff - see the *Access* menu on page A-3.

Exit OMT32 - see the *File* menu on page A-2.

Configuration - see the *Operations* menu on page A-7.

Status - see the *Operations* menu on page A-7.

Testpoints - see the *Operations* menu on page A-7.

Toggling active repeater part - see the *Operations* menu on page A-7.

Received repeater alarms - see the *Operations* menu on page A-8.

Repeater event log - see the *Operations* menu on page A-8.

Alarm reset - see the *Operations* menu on page A-8.

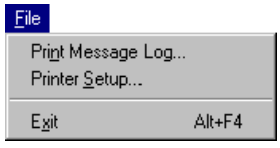
About OMT32 - see the *Help* menu on page A-12.

Main Menu Reference Guide

The main window has the following menu:

This menu is described below.

File



Print Message Log

Prints the contents of the *Message Log*, further detailed in the description of the OMT32 main window.

See the *Main Window After Logging On* section in Chapter 8.

Printer Setup

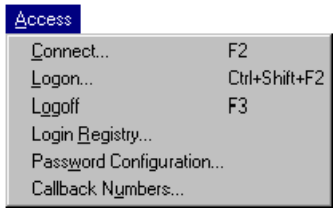
Opens the Windows standard printer setup dialog box.

Exit

Logs you off from the repeater (if logged on) and exits the OMT32.

See the *Exiting OMT32* section in Chapter 9.

Access



Connect

Initiates local or remote connection to a repeater.

See the *Connecting Repeater* section in Chapter 8.

Logon

This option is used to log on a repeater without logging off, e.g. to change to another password level or to log on another repeater in an R2R network.

Logoff

Logs you off from the repeater and, if you are remotely connected, disconnects the OMT32/PC from the repeater.

See the *Logging Off* section in Chapter 10.

Login Registry

Opens a logon registry list containing users that have been logged on the repeater.

See the *Login Registry* section in Chapter 10.

Password Configuration

Opens the password dialog box for setting and changing passwords and callback criteria.

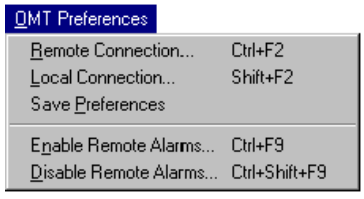
See the *Password and Callback* section in Chapter 10.

Callback Numbers

Opens the callback phone number list, containing those phone numbers which the repeater can use to call back at logon.

See the *Callback Phone Numbers* section in Chapter 10.

OMT Preferences



Remote Connection

Opens the remote connection dialog box in which you can change the phone number, modem initiation string and communication PC port for the OMT32 modem.

See the *Remote Connection* section in Chapter 9.

Local Connection

Opens the local connection dialog box in which you can select communication PC port for local connection to the repeater.

See the *Local Connection* section in Chapter 9.

Save Preferences

Saves current OMT32 settings. This procedure is automatically performed each time you exit OMT32, but this option makes it possible to save the settings when running the OMT32.

Enable Remote Alarms

Sets the OMT32 in reception mode for alarm calls from repeaters.

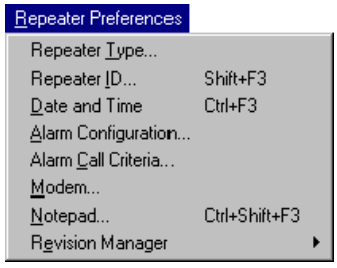
See the *Disabling/Enabling Remote Alarm Reception* section in Chapter 11.

Disable Remote Alarms

Sets the OMT32 in non-reception mode for remote alarm calls from repeaters.

See the *Disabling/Enabling Remote Alarm Reception* section in Chapter 11.

Repeater Preferences



Repeater Type

Shows, for combined repeaters, active repeater unit (channel selective or band selective unit).

See *Active Repeater Part (Combined Repeater Only)* in Chapter 10.

Repeater ID

Opens the dialog box in which the repeater ID can be changed.

See the *Repeater ID* section in Chapter 10.

Date and Time

Opens the dialog box for setting the CU board clock in the repeater.

See the *Repeater Date and Time* section in Chapter 10.

Alarm Configuration

Shows the alarm configuration. Alarm levels can also be selected for the external alarm inputs.

See *the Alarm Configuration* section in Chapter 11.

Alarm Call Criteria

Shows the phone numbers and call time intervals for alarm calls. This information can also can be changed in the window which is opened.

See the *Alarm Call Criteria* section in Chapter 11.

Modem

Opens the dialog box for viewing and changing the repeater modem initiation string.

☞ *Be careful not to set an incorrect string at remote control. A visit to the repeater site may be the result, and you will get no alarm call until a correct string has been entered. The default string should not be changed.*

See *the Repeater Modem Parameters* section in Chapter 10.

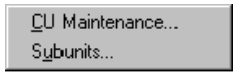
Notepad

Opens the window for a notepad facility in which the text is stored in the repeater and available for operators and service personnel, locally or remotely connected.

See the *Notepad* section in Chapter 10.

Revision Manager

Opens the following sub menu:



CU Maintenance

Shows the CU hardware and software part numbers and revision status, and allows CU software to be downloaded to the repeater from OMT32, either locally or remotely connected.

☞ *Do not update or reboot the CU software unless you are authorized and trained to download software to repeaters.*

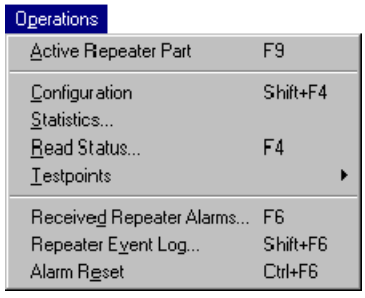
See the *CU Software Maintenance* section Chapter 10.

Subunits

Shows software and hardware version, serial number and manufacturing data for installed amplifier boards.

See *Repeater Boards (CHA/BSA/CSA/PA/RIA)* in Chapter 10.

Operations



Active Repeater Part

Toggles between active channel selective part and band selective part, if OMT32 is connected to a combined repeater.

See *Active Repeater Part (Combined Repeater Only)* in Chapter 10.

Configuration

Shows the configuration for channel selective or band selective operation depending on the type of the connected repeater.

See the *Repeater Configuration* section in Chapter 10.

Statistics

Opens a dialog box in which status parameters can be set and displays status for the statistics.

See the *Traffic Statistics* section in Chapter 10.

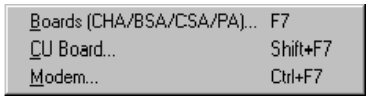
Read Status

Shows operational status for channel selective or band selective operation depending on the type of the connected repeater.

See the *Operational Status* section in Chapter 10.

Testpoints

Opens the following sub menu:



Boards (CHA/BSA/CSA/PA)

Shows the values from the testpoints located on the channel selective or band selective amplifier boards.

See the *Testpoints* section in in Chapter 10.

CU Board

Shows the values from the testpoints located on the CU board.

See the *CU Board* section in Chapter 10.

Modem

Shows information from the repeater modem.

See the *Repeater Modem* section in Chapter 10.

Received Repeater Alarms

Shows the alarm list received from one or several repeaters.

See the *Received Repeater Alarms* section in Chapter 11.

Repeater Event Log

Shows the repeater event log contents.

See the *Repeater Event Log* section in Chapter 11.

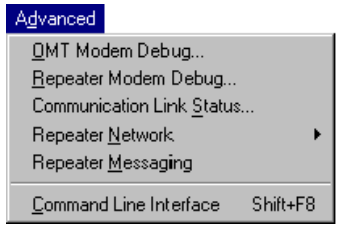
Alarm Reset

Clears all alarms and resets all process counters in the repeater.

The reset procedure does not affect uplink or downlink communication in progress.

See the *Alarm Reset* section in Chapter 11.

Advanced



OMT Modem Debug

This option is intended for service and trouble shooting.

Opens an OMT32 modem debug tool. This tool contains a list of AT commands which can be sent to the modem.

This option is only available when OMT32 is not connected to a repeater.

Repeater Modem Debug

This option is intended for service and trouble shooting.

The same feature as the previous *OMT Modem Debug* option, but for the repeater modem.

This option is only available when OMT32 is locally connected to the repeater.

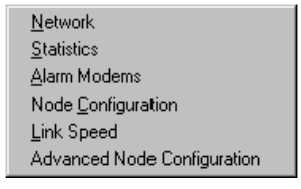
Communication Link Status

This option is intended for service and trouble shooting.

Shows continuously updated information about the communication between OMT32 and the repeater.

Repeater Network

Opens the following sub menu:



Network

Opens an R2R network settings window.

See the *Network Settings* section in Chapter 13.

Statistics

Opens an R2R network statistics window.

See the *Network Statistics* section in Chapter 13.

Alarm Modems

Opens an R2R alarm configuration dialog box.

See the *Alarm Configuration* section in Chapter 13.

Node Configuration

Opens an R2R node configuration dialog box.

See the *Node Configuration* section in Chapter 13.

Link Speed

Opens an R2R communication dialog box intended for fault tracing.

See the *R2R, Communication Problem* section in Chapter 12.

Advanced node Configuration

Opens an R2R communication dialog box intended for fault tracing.

See the *R2R, Advanced Node Configuration* section in Chapter 12.

Repeater Messaging

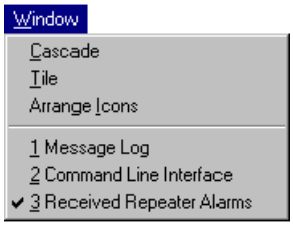
This feature is not implemented in the current version.

Command Line Interface

Opens the command line for entering CLI commands.

See the *Command Line Interface* section in Chapter 9.

Window



Cascade

When more than one window is open and not minimized to icons, this option arrange the windows in a cascade formation with overlap so that the title bar of each window is shown.

Tile

When more than one window is open and not minimized to icons, this option arranges the windows in a tile formation, side by side, with no overlapping.

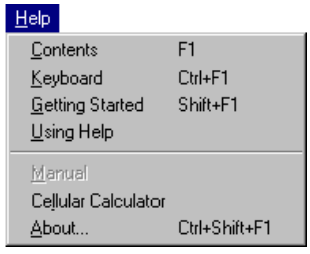
Arrange Icons

This option arranges all icons in the active window to be aligned horizontally and vertically.

Opened windows

Lines below the Arrange Icons option, if shown, reflect opened or iconized windows.

Help



Contents

Shows a table of contents on available on-line help topics.

Keyboard

Shows a list of keyboard shortcuts and corresponding menu options.

Getting Started

Shows the main steps to get started, and some important hints.

Using Help

Shows information about how to use the on-line help.

Manual

This feature is not implemented in the current version.

Cellular Calculator

Opens a calculator for channel data intended to be a help for cell planning work.

See the *Cellular Calculator* section in Chapter 9.

About

Shows the registered OMT32 holder and the OMT32 version.

See the *OMT32 Version* section in Chapter 9.

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Questionnaire

The aim of this manual is to guide you when installing and operating the Allgon repeaters, and to answer questions that may turn up. To ensure that we provide appropriate information for these purposes, we would appreciate your views and suggestions on how to improve the manual in this direction. Please, fill out the following questionnaire and send it to us.

1

Have you read entire sections or do you use the manual to look up specific information when needed?

❑ Read entire sections ❑ Look up specific information

Comments: _____

_____

2

Do you think the information is easy to find and understand?

❑ Yes ❑ No

Comments: _____

_____

3

Do you find any function of the Allgon repeater hard to understand, a function which should be subjected to more detailed description?

❑ Yes ❑ No

If yes, which one: _____

_____

4

Do you have any suggestions on how we can improve this manual?

_____

_____

_____

Title (Mr/Ms/Other): _____ Initial: _____

Surname: _____ Job title: _____

Company: _____ Address: _____

City: _____ Country: _____ Phone: _____

Thanks for your kind help. It's very valuable to us.

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No envelope required.

If you prefer to send by fax, use this number: +46 8 540 824 85