

Paging, PG1

INTERWORK DESCR



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GENERAL

Function block PG1 is the interface of MX-ONE to the peripheral paging equipment with E&M signaling (serial). Examples of this type of equipment are systems designed in accordance with ESPA 4.4.3-standard and Ericsson Radio Systems ERICALL 200 with EC 266 interface.

Other systems with E&M signaling can be connected also, but in such cases the various interface variants of PG1 should be compared in detail with the interface of the paging equipment. A signaling alternative that makes optimum use of the functions of both PBX and the peripheral paging equipment should be selected. The peripheral equipment frequently also provides different interface alternatives.

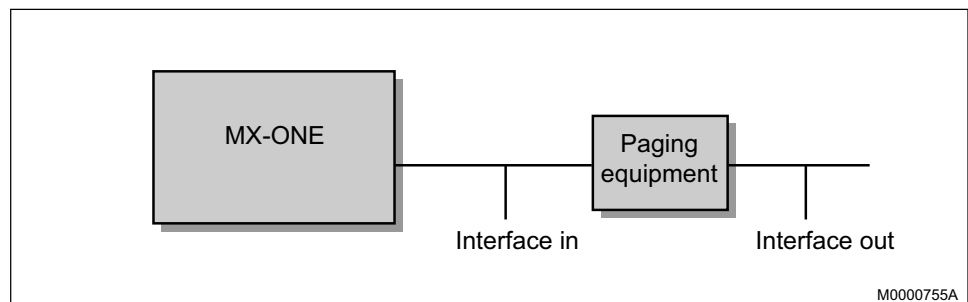


Figure 1: Interface PG1 - peripheral paging equipment

The E&M-interface possesses the following characteristics (see 2 Paging interface with E&M signaling on page 4):

- M-wire for transmission of line signals from the PBX to the paging equipment, e.g. seizure, clearance and pulsing.
- E-wire for transmission of line signals from paging equipment to the PBX, e.g. end-of-selection, paging in progress, absence-marked paging receiver and clearance request.
- In addition to the E&M-wires two or four-wire speech connection for one or bothway speech via the radio and for transmission of DTMF-signaling (Dual Tone Multifrequency) from the PBX to paging equipment and verification tones such as proceed-to-send tone and start talking tone burst on speech connection in the backwards direction.
- All digit information from PBX to paging equipment such as paging code, mode digit and display message is sent in serial form, either by pulsing via the M-wire or as DTMF-signaling via the speech wires.
- Optionally, a separate B-wire can be used for transmission of the signal "absence-marked paging receiver" to the PBX when Ericsson Radio EC 266-interface is used.

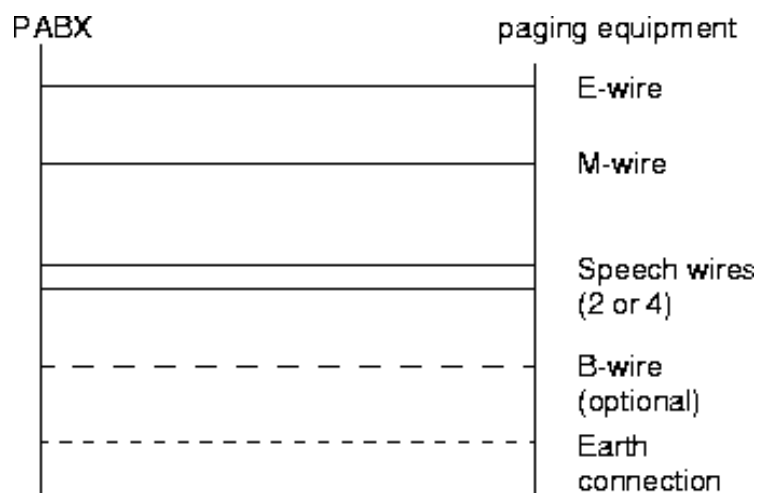


Figure 2: Paging interface with E&M signaling

PG1 can administer signals as follows:

Signals to paging equipment:

seizure digit sending clear forward

Signals from paging equipment:

proceed to send end of selection paging in progress absence start talk WPE-ready
power off

2 INTERFACE IN

2.1 GENERAL

The following product shall be used as E&M-hardware interface in the PBX:

TLU80

TLU 80 is a software configured board that emulates the old TLU13, TLU22 or TLU23 boards.

All individuals are connected with own E, M, B and speech wires. TLU80 has 4 individuals.

Note: Old boards TLU13, TLU19, TLU22 and TLU23 could be used in TSW, but are not supported in ASP 113. Functionally, the products were identical, but the old boards had 3 individuals.

Note: Channels for different paging sectors must not be connected on the same TLU-board. Nor may E&M tie-lines or announcing machine equipment be connected on a board with paging channels.

2.2 LOGICAL INTERFACE

PG1 administers signals in the interface to the peripheral paging equipment.

2.2.1 SEIZURE

When a channel has been reserved in the PBX for a call to paging equipment the seizure signal is sent immediately to the paging equipment by activation of the M-wire. The polarity of the M-wire is programmable.

See parameter description for *PAGING*, parameter VAR for PG1.

2.2.2 DIGIT TRANSMISSION

Digits are transmitted via the interface either by pulsing via the M-wire or with DTMF-signaling via speech wires. The digit information is assembled in the PBX on the basis of the procedure used and the categories of the pagee (person paged). The format and contents of the digit information can be routed in PG1.

See parameter description for *PAGING*, parameter VAR for PG1.

2.2.2.1 *Paging code only*

In its simplest form the digit information consists solely of the paging code . The paging code is used by the peripheral paging equipment in order to address the paged receiver. The length of the paging code is determined when a person is allocated a paging receiver and the paging code is fed in.

See parameter description for *PAGING*, parameter SCD.

PAGING CODE

Paging code 2-4 digits

When the paging code only is used the paging equipment cannot differentiate between different types of calls. All call types are indicated in the same manner in the paging receiver.

2.2.2.2

Paging code and mode digit

Paging code complemented with mode digit shall be used when one wishes to differentiate between different types of calls, for example:

- call to a person/group of persons
- external/internal calls
- paging without voice/with voice
- paging with display
- alarm/alarm acknowledgment

The standard mode digit can assume the values 0...9. Each of the ten values is locked to a specific call type. In order to adapt different types of paging equipment to the PABX it is possible to use conversion table for mode digits.

See parameter description for *PAGING*, parameter VAR for PG1 .

The mode digit for those call types it is wished to differentiate between are to be programmed/strapped in different ways in the peripheral paging equipment, e.g. so that a number of "bleeps" or code characters in the window of the paging receiver vary for different mode digits.

Normally the mode digit is sent after the paging code. PG1 can also be programmed to transmit the mode digit before the paging code.

See parameter description for *PAGING*, parameter VAR for PG1.

PAGING CODE	M
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M	PAGING CODE
---	-------------

Paging code 2 - 4 digits Mode digit (M) 1 digit

2.2.2.3

Digit message to display

In addition to paging code and mode digit a digit message can be transmitted to be displayed on the paging receiver.

The contents of the display message are assembled:

- Automatically with A and/or B-number on the basis of the category of the pagee for standard paging. See parameter description for *PAGING*, parameter PCAT.
- Automatically with alarm group code on the basis of the pager's paging data on initiation of alarm. See parameter description for *PAGING*, parameter CODE.
- From digits stated in the procedure for paging with an arbitrary display message.

The display message is formatted in PG1 up to 10 digits on transmission of A-number and up to 10 + 5 digits for transmission of A and B-numbers. The arbitrary display message is limited by PG1 to 10 digits.

See parameter description for *PAGING*, parameter VAR for PG1 .

PAGING CODE	M	up to 10	up to 5
		A-number	B-number

Automatic directory number transmission

PAGING CODE	M	1 10
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Transmission of arbitrary display message

2.2.3

CLEAR FORWARD

The channel is disconnected by the PABX in the following traffic cases:

- Signal "WPE ready" has been received from the paging equipment.
- Signal absence marked paging receiver has been received from the paging equipment.
- On meet me and voice paging when the pager goes on hook.
- When time supervision "total seizure time for paging channel" has expired. See parameter description for *PAGING*, parameter THO.
- Incorrect signal from paging equipment is accepted or expected signal is not received, e.g. proceed-to-send signal.

When the channel is cleared, the speech wires resume idle state. The channel is normally freemarked 30 ms later and can then receive a new call. Where necessary, the time between clearing and free-marking can be prolonged by another 1-9 seconds. See parameter description for *PAGING*, parameter TH .

When clear acknowledgment is expected from the paging equipment (E-wire is active on clearance) releasing will be undertaken first after acknowledgment has been obtained.

2.2.4

PROCEED-TO-SEND SIGNAL

This signal is sent from the paging equipment to confirm that the seizure was successful and to indicate that the paging equipment is ready to receive digits. PG1 starts the digit sending on receipt of this signal. The signal may either be received in the form of a 425 Hz tone message on the speech wires or as a line signal via the E-wire. See parameter description for *PAGING*, parameter VAR for PG1. Use of the proceed-to-send signal is recommended.

2.2.5 END-OF-SELECTION SIGNAL

On receipt of the end-of-selection signal the PBX stops digit transmission and anticipates that paging will start in the peripheral paging equipment. For voice paging the end-of-selection signal can be used to initiate establishment of the speech path through the PBX. The signal is obtained via the E-wire, see 3 End-of-selection signal and paging in progress signal on E-wire. on page 8. See parameter description for *PAGING*, parameter VAR for PG1.

2.2.6 PAGING IN PROGRESS

The signal indicates that paging is in progress and that the paging receiver is not marked absent. The signal is obtained as a short pulse on the E-wire, see 3 End-of-selection signal and paging in progress signal on E-wire. on page 8.

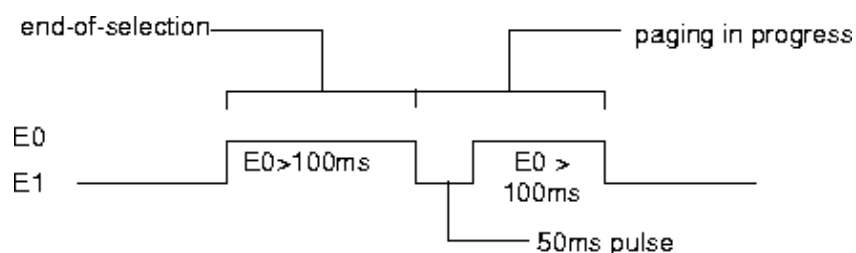


Figure 3: End-of-selection signal and paging in progress signal on E-wire.

2.2.7 ABSENCE MARKING

The signal indicates that the paging receiver is marked absent (off duty), e.g. is placed in the charging compartment. The signal absence-marked paging receiver can be received in the following ways:

- No paging in progress signal has been received before the paging equipment requests clearance.
- Short pulse on E-wire
- State change on B-wire.

See parameter description for *PAGING*, parameter VAR for PG1.

The absence signal leads to release of the paging channel.

2.2.8 START-TO-TALK SIGNAL

This signal indicates that the voice channel has been opened via radio. The signal is included in certain signal diagrams and is obtained only when the PBX has requested voice paging. The voice channel in the PBX is always connected for voice paging already before digit transmission has been completed. Consequently the start-to-talk signal does not lead to any action in the PBX.

When the speech path is opened after digit transmission all tone sending from the PBX ceases. Start talk tone shall be programmed/strapped in the paging equipment. The speech path through the PBX is always both-way. Speech connection via radio can be one-way or both-way.

2.2.9

WPE-READY

This signal indicates that the paging equipment has terminated paging via radio and can be disconnected. If the PBX has already undertaken clearance (see chapter clear forward) the signal will be interpreted as clear acknowledgment.

2.2.10

DISTURBANCE MARKING

If the signaling diagram includes a proceed-to-send signal from the paging equipment, PG1 will supervise the reception of this signal. The absence of a proceed-to-send signal will result in disturbance-marking of the channel, which means that the channel will be used only if there are no other free channels in the paging area. When a new problem-free proceed-to-send signal arrives, the disturbance marking is erased automatically.

2.2.11

AUTOMATIC BLOCKING

A paging channel will be blocked automatically in the following cases:

- When the proceed-to-send signal from the paging equipment has not been received 5 times consecutively on the disturbance marked channel.
- When a break on the E-wire is detected for 6 minutes. This function is used only with those signal diagrams in which the E-wire in idle is a make contact.

The channel will be deblocked automatically if a signal is received on the E-wire. PG1 performs automatic test seizures of the blocked channel at intervals of 6 minutes. If a proceed-to-send signal is obtained on test seizure the channel will be deblocked and marked free.

2.3

ELECTRICAL INTERFACE

E and B-wires are fed current in the PBX from -48V via the detectors. In the peripheral paging equipment the M-wire shall be fed current via the detector from a voltage source 8...48V or -8...-48V. See 4 Electrical interface on page 10.

The paging equipment shall be earthed to the same place as the PBX is earthed.

Receive circuits E and B-wires:

Resistance to	-48V	12-15 kohms
Detects	< 1.5 kohms to 0	+/-3V
Does not detect	> 20 kohms to 0	+/-3V

Transmission levels TLU13:

Two wire	in -1.0	out -4.0 dBr
Four wire	in -3.5	out -3.5 dBr

Transmission levels TLU19:

Two wire	in -3.0	out -3.0 dBr
Four wire	in -5.2	out -5.7 dBr

Transmission levels TLU22:

Two wire	in -2.0	out -1.0 dBr
Four wire	in -2.7	out -3.2 dBr

Transmission levels TLU23:

Two wirein	in -3.0	out -3.0 dBr
Four wirein	in -3.0	out -3.0 dBr

Input impedance and hybrid impedance balance two wire: 600 ohms

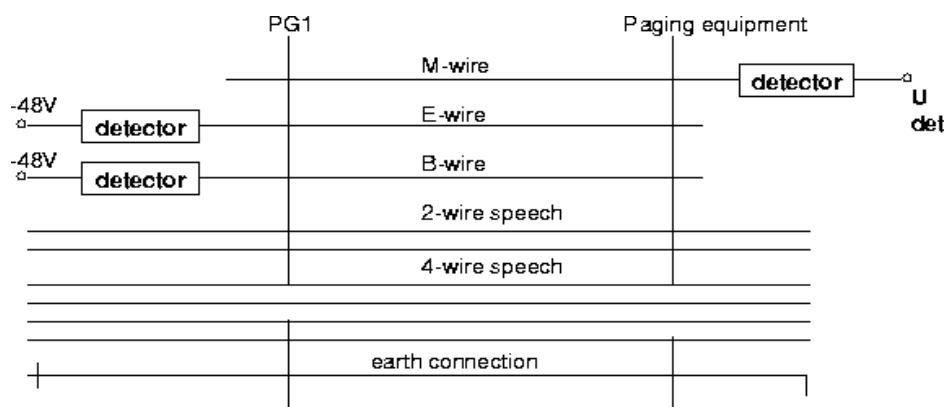


Figure 4: Electrical interface

2.4

MECHANICAL INTERFACE

The peripheral paging equipment is connected to the PBX via the main distribution frame (MDF).

2.5

PROTOCOL

Protocol (= signal diagram) varies for different paging equipment.

In document interworking application 1 PG1 the signal diagram is described for ERA EC200 with EC266-interface.

In document interworking application 2 PG1 the signal diagram is described in accordance with the ESPA 4.4.3-recommendation.

The signal diagram can be altered using parameters.

See parameter description for *PAGING*, parameter VAR for PG1 .

3 INTERFACE OUT

Not described. (Varies depending on the manufacturer of the paging equipment).

4 OPERATOR INTERFACE

The PG1-interface in the PABX is programmed via the PBX's I/O-interface. See operational directions for *PAGING*.