



**DATA SHEET**

***Emergency call system from train to  
ground mod. **ECS-T2G*****

**ST-ECS.T2G-01**

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# ***Emergency call System***

## ***ECS-T2G***

***( Emergency Call System - Train To Ground)***

REDATTO	VISTO	VISTO	APPROVATO
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Data, 10/07/2006	Data, 10/07/2006	Data, 10/07/2006	Data, 10/07/2006



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#### 1.INTRODUCTION

The ECS-T2G (Emergency Call System - Train To Ground) was designed specifically for resolving the problem of fast and reliable transmission of emergency calls made by passengers to ground personnel for requesting aid.

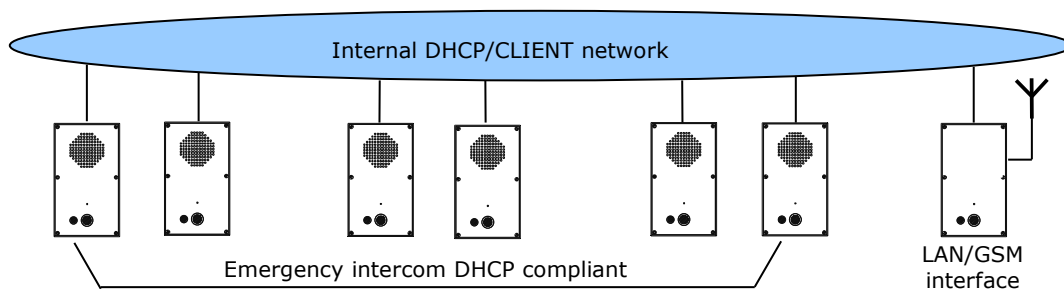
Two communication transmission technologies are used for train to ground emergency calls:

- LAN connection on the train
- GSM connection between train and ground

The simplest version has a system comprising:

- Two or more audio units for emergency calls (with a maximum of 128) placed along the train (code INT.T2G; Intercom – Train to Ground)
- An interface unit between the LAN and GSM networks (code GSM.T2G; GSM – Train to Ground)

The system is illustrated in the diagram below.



The INT-T2G emergency audio unit and the GSM-T2G interface unit are both standalone devices with hardware and firmware designed specifically by ERMES for this kind of application; the system can be installed on an existing LAN network either by allocating set IP addresses to each device or by obtaining the IP addresses from the server managing the network (DHCP mode).

Alternatively, the system can use a straightforward LAN network designed especially for this service, comprising a set of HUBs, insofar that the devices can manage this type of connection autonomously. The advantage of the latter solution is that the system cannot be affected by crashing of the main LAN network managed by the server.


Optionally, the system in question can be integrated and completed with two other units, broadening its functionality.

These units are:

- The main control unit on the train (code MCU.T2G ; Main Control Unit – Train To Ground)
- The public address unit (code PAU.T2G ; Public Address Unit – Train To Ground)

The MCU-T2G unit is used to “filter” emergency calls from an operator on board the train; this unit can also be used for Public Address messages generated automatically by the integrated speech synthesis device or voiced directly by the train operator in charge of the service.

The PAU-T2G is a powerful and complete audio amplifier set that can interface a set of loudspeakers with the LAN network, for public announcements or playing background music.

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The MCU.T2G and PAU-T2G units are not described in this document; further information is available upon request.

## 2. EMERGENCY CALL UNITS

The INT.T2G emergency call unit is fitted with:

- A call button
- A signalling LED
- A loudspeaker
- A microphone

The unit is available in two versions, for fitting to a wall or within a hole in the wall.

This unit is particularly easy to install, as it only requires connection of a power cable and network cable; a PoE (Power over Ethernet) version is also available requiring only connection of a LAN cable, as the electronic circuits are powered directly by the Ethernet network.

A Flash Eprom memory in the device can memorize a set of messages that can be reproduced during the different operation phases, helping the passenger to operate the emergency call system.

These messages relate to the following:

- Call forwarding (e.g. "Please wait while your call is being forwarded")
- Unavailable GSM communication line (e.g. "The line is currently engaged, your call has been placed in a queue")
- Cancelled call due to indisposition of ground operator (e.g. "The operator cannot answer, your call has been cancelled")
- System out of service (e.g. "The system is out of service, your call cannot be forwarded")
- End of call (e.g. "Your call is over. The system is available for a new call")

The INT.T2G emergency call unit also comes with programming software for customizing service messages and for easily configuring all other operation parameters.

The INT.T2G emergency call unit does not use any PC hardware or operating systems, and is fully designed by ERMES with industrial criteria guaranteeing maximum reliability in all conditions of use and with complete ease of operation.

<b>INT-T2G TECHNICAL SPECIFICATIONS</b>	
Audio Codec	Linear – Sampling frequency 8 kHz – 16 bit resolution
Protocol	UDP / TCP / DHCP
Bandwidth occupation	About 350 kbit/s with call in progress
Microphone	Electret unidirectional – 2.2 kohm – S/N 56 dB
Microphone pre-amplifier	Selectable gain 0/+20dB
Intercom amplifier	Mylar cone - 2W - 8 ohm (100 -10kHz)
Call buttons	1 Anti vandal steel construction – 1,000,000 operations
Indicators	High efficiency LED lamp – Anti vandal
LAN	10/100 base T - RJ45 connector to IEEE 802-3 standard
Processor	MultiMedia DSP 32 bit / 300MHZ
RoHS	RoHS compliant to EU regulation.
Power supply	24 Vac – 3 W (PoE on request)
Operating temperature	-10°C to 55°C



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### 3.LAN/GSM INTERFACE UNIT

The GSM-T2G unit acts as an interface between the LAN and GSM network but also includes a module with antenna for managing GSM calls.

Operation of the GSM-T2G module is fully automatic and so, unlike the INT.T2G units, can be installed in a private area inaccessible to passengers.

This unit, too, is particularly easy to install as it only has to be connected to a power cable and network cable; it is also available in a PoE (Power over Ethernet) version which only requires connection of the LAN cable as the electronic circuits are powered by the Ethernet network.

The GSM-T2G unit comes with an antenna for GSM connection and operation indicator lights on its front.

This device has a Flash Eprom memory for memorizing:

- An audio message identifying the unit making the call (e.g. "Emergency call from train n. 2342")
- A set of four telephone numbers automatically called in succession if the emergency call is deactivated

Furthermore, if the INT.T2G units are allocated static IP addresses, the identification messages can also be used to identify the carriage and device from which the emergency call was made.

The GSM.T2G interface unit also comes with programming software for memorizing identification messages, telephone numbers and configuring all other operation parameters.

The INT.T2G emergency call unit does not require any PC hardware or operating systems, and is fully designed by ERMES with industrial criteria guaranteeing maximum reliability in all conditions of use and with complete ease of operation.

GSM-T2G TECHNICAL SPECIFICATIONS	
<b>LAN SECTION</b>	
Protocol	UDP / TCP / DHCP
Indicators	High efficiency LED lamp - Anti vandal
LAN	10/100 base T - RJ45 connector to IEEE 802-3 standard
Processor	MultiMedia DSP 32 bit / 300MHZ
RoHS	RoHS compliant to EU regulation.
Power supply	24 Vac - 3 W (PoE on request)
Operating temperature	-10°C to 55°C
<b>GSM SECTION</b>	
Band	Quad-band EGSM 850 / 900 / 1800 / 1900 MHz
Output power	Class 4 (2W) @ 850 / 900 MHz - Class 1 (1 W) @ 1800 / 1900 MHz
Sensitivity	- 107 dBm (typ) @ 850 / 900 MHz - - 106 dBm (typ) @ 1800 / 1900 MHz
RoHS	RoHS compliant to EU regulation.

### 4.INT-T2G UNIT'S OPERATIONAL CYCLE

The following points describe INT-T2G's operational cycle when an emergency call is made:

- A passenger requiring to make an emergency call and communicate with the operator of the main control unit has to press the call button on the INT-T2G unit.
- An out-of-service message is provided if it is not possible to communicate with the GSM-T2G interface unit or if GSM coverage is absent ("The system is out of service, your call cannot be forwarded")



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- If another emergency call is being made, the INT-T2G unit gives a warning message such as "The line is currently engaged, your call has been placed in a queue". If the line is freed within a set period of time, the call is forwarded as described in the following paragraph. If the telephone line still isn't free after the set period of time, the INT-T2G unit communicates a message such as "The operator cannot answer, your call has been cancelled", the call is cancelled and the INT-T2G terminal is ready for a new call.
- If the call is successful, it is forwarded by the GSM-T2G interface unit to the operator in the main control room and the INT-T2G unit plays a message such as "Please wait, your call is being forwarded". Also, the LED indicator light on the front of the device flashes on and off.
- If the operator of the main control unit does not answer the call within a set period of time, a time-out message is announced "The operator cannot answer, your call has been cancelled" and the system is restored to normal.
- Pressing the call button again when waiting for an answer or during the audio conversation has no effect.
- When the operator of the main control panel picks up the phone, the flashing LED indicator light on the front of the device stays constant and the conversation can start.
- The audio conversation is ended by the operator of the main control room. The INT-T2G terminal communicates a message stating the end of communication such as "Your call has ended. The system is ready for a new call", the indicator light switches off and the INT-T2G terminal is ready to accept a new call.

#### **5.ANSWER BY THE OPERATOR OF THE MAIN CONTROL ROOM**

The following points describe the operational cycle of the operator answering the emergency call made with a INT-T2G unit on the train:

- When a passenger makes an emergency call via a INT-T2G unit on the train, the control room operator receives an ordinary telephone call on his phone which he should answer in the usual fashion (by lifting the handset on an ordinary phone or pressing the Accept button on a GSM phone).
- When the call is accepted, the GSM-T2G interface unit automatically sends a message specifying the train from which the call is made. The message is such as "Emergency call from train n. 2342".
- The GSM-T2G interface unit continues to repeat the identification message until the operator confirms to have understood it by pressing 5 on his telephone pad.
- The GSM-T2G unit receives the tone of key number 5 when it is pressed and immediately puts the INT.T2G communication unit used to make the call directly in contact with the operator of the main control room, and communication can start.
- When communication is ended, the control panel operator can end the call by replacing the handset or pressing "End" on his mobile phone, and the system is ready for a new call.