

Cellular Engine TC35

The extra compact module for voice and data transmission

Application Note: **EMI/Audio**

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1 Introduction

This document describes additionally to TC35_HW_Interface_description improvements of EMI/EMC performance of the Siemens GSM engine TC35.

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1.1 Terms and Abbreviations

EMC	Electro Magnetic Compatibility
EMI	Electro Magnetic Interference
FFC	Flat Flexible Cable
PCB	Printed Circuit Board
ZIF	Zero Insertion Force

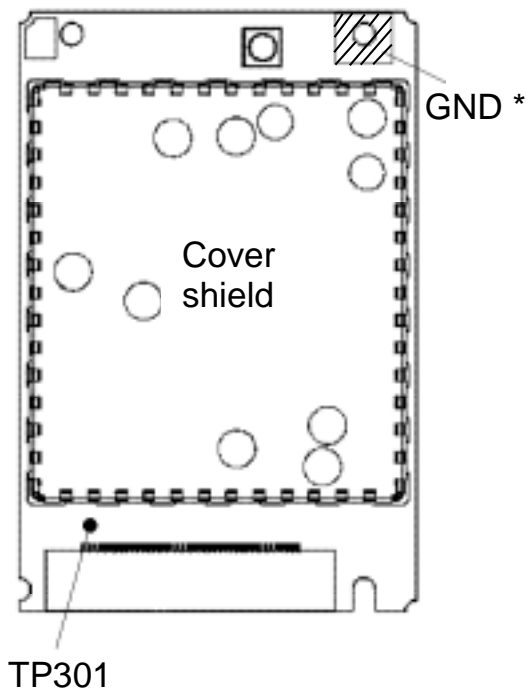
2 Recommendation against hum and noise in audio application

2.1 Low resistance connection to ground

In case of using the FFC in a max. length of 200 mm it could be necessary to avoid supply voltage drop out during the GSM burst.

Use an additional cable fixed under the mounting hole for the TC35 and solder the other side on your application to battery ground.

Do not solder on the TC 35 cover !



*** for low GND impedance connect TC35 GND to application ground battery**

Figure 1: Sketch of the module TC35 (top view)

2.2 ZIF-Connector and FFC

Use the FFC in your application as short as possible.

3 General

Integrating the TC35 into your application and installing it inside a small and compact cabinet some care must be taken to prevent the module from spoiling its excellent audio characteristics. This decrease in performance might happen by twisting the FFC or folding it. Even a higher quality of the audio channel, i.e. higher suppression of the GSM-noise can be achieved by a proper grounding of the module.

3.1 Resistance of the power supply lines

The input terminal for the microphone signals of the TC35 is a balanced input and the best noise suppression for this signal is achieved when any parasitic signal couples to both input lines with the same field strength. But it is self explanatory that the best case is, if no parasitic signal is present. Under some circumstances this ideal case can not be made so some special treatments improves the real world behaviour.

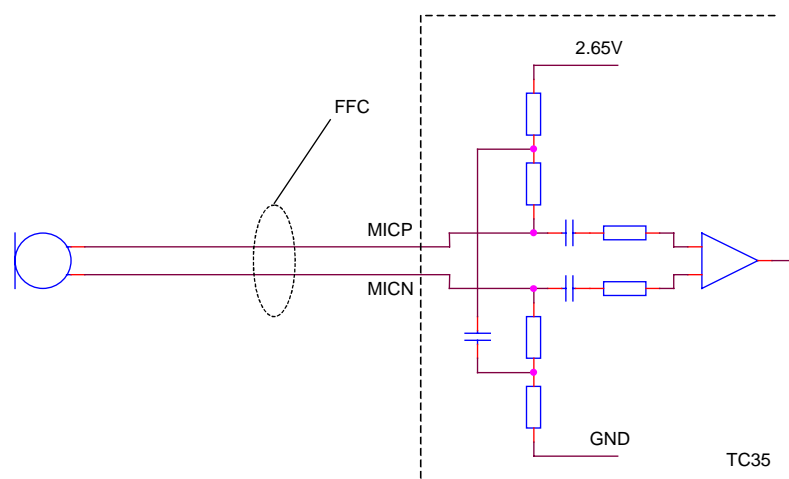


Figure 2: Idealised diagram of the audio input terminal

As shown in Figure 2 especially a long FFC can cause problems since in this case it works as an antenna for EMI signals radiated by equipment close to the TC35. This also can happen if the FFC is folded in such a way that the power lines lay over the microphone lines. So care must be taken to keep the overall length of the FFC as short as possible and it should not be mounted in direct contact to any switching regulator of a power supply unit or close to any other digital blocks. Also self explanatory is that all the issues discussed here still require a full balanced electrical network installed in the vicinity of the microphone and can not lessen these demands.

For a proper installation we suggest a mounting of the TC35 on top of a solid metal plate and inserting the FFC between them. In this case the FFC is shielded by the metal plate and the PCB of the TC35 likewise in a sandwich structure. For this, good electrical contacts between the ground pad of the TC35, the shielding plate and the ground pin of the battery should be made. Even for short lengths of the FFC we strongly recommend to install a shielding as described above.

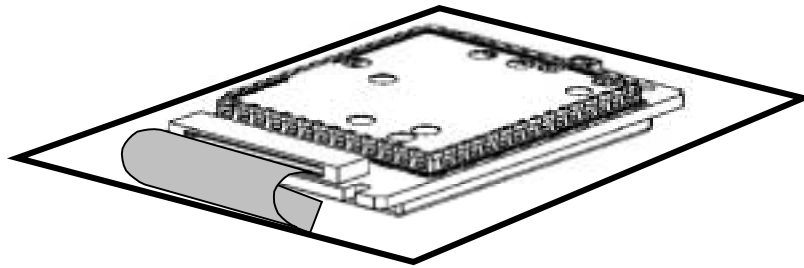


Figure 3: Mounting of the TC35 on a metal plate

For more detailed information take a closer look on Figure 1 to find the location of the ground pad. This pad is usable for contacting with a spacer or screw.