

RFID & NFC Module

TM-007 Mini

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TM-007 Mini

Multiprotocol Fully

Integrated 13.56MHz

RFID & NFC Module

Datasheet

TM-007 Mini



10mm x20mm x 1.8mm

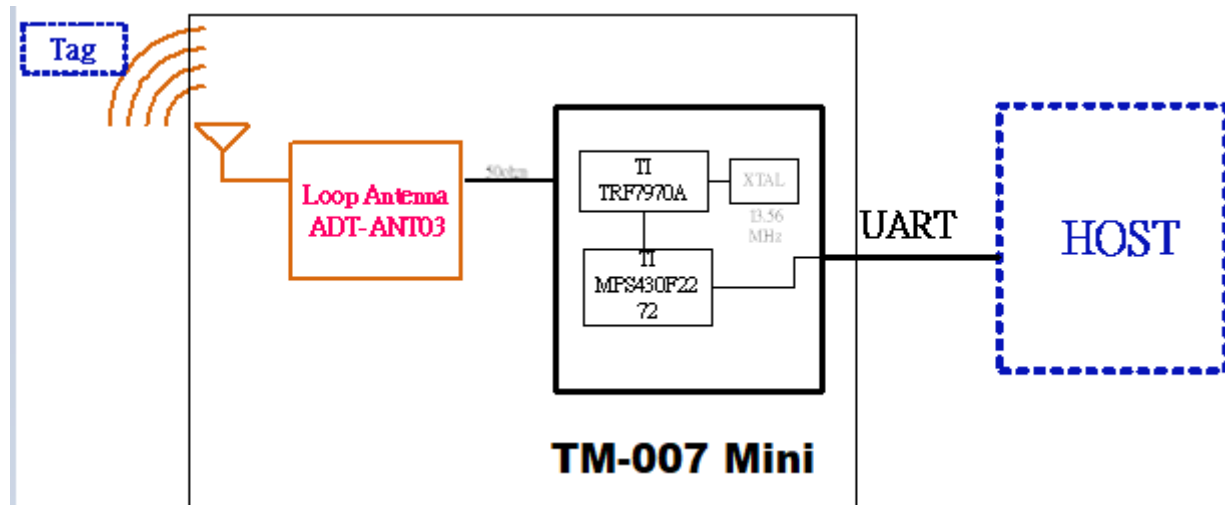
PRODUCT DESCRIPTION

The **TM-007 Mini** is a RFID/NFC module for integration into Table, Notebook, PDA, label printers, handheld devices and in general any fixed or mobile short and medium range device requiring RFID/NFC technology. TSC-005 supports Near Field Communication Standards NFCIP-1 (ISO/IEC 18092) and NFCIP-2 (ISO/IEC 21481) which defines the detection of any of the four possible communication modes (Proximity reader/writer, ISO 14443A/B or Felica and Vicinity reader/writer –ISO15693. TSC-005, its simplified UART interface, low power consumption and superior performance, make it easy to integrate any device with NFC technology.

FEATURES

- Support NFCIP-1, NFCIP-2, Reader/Writer
- Multi protocol HF RFID Tag support including: ISO15693, ISO14443A, ISO14443B and FeliCa®.
- 200 mW maximum output power
- Standard 50 ohm antenna output port
- Host interface: UART.
- Baud rate: 115200bps, 8, N, 1

- **BLOCK DIAGRAM**



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• SPECIFICATION

Item	Min.	Typical	Max.	Unit	Condition
Operation Voltage	2.7	5	5.5	V	VDD
VSS		0		V	
V _{OH}	VCC_M-0.25		VCC_M	V	I(OHmax) = -1.5 mA (see Note 1)
	VCC_M-0.6		VCC_M	V	I(OHmax) = -6 mA (see Note 2)
V _{OL}	VSS		VSS+0.25	V	I(OLmax) = 1.5 mA (see Note 1)
	VSS		VSS+0.6	V	I(OLmax) = 6 mA (see Note 2)
RF Output Power			200	mW	
RF Transmit Peak Current		250		mA	
Baud Rate		115200		bps	8,N,1
RF Frequency Range	13.553	13.56	13.567	MHz	
Operating Temperature	0	25	70	°C	
Storage Temperature	-25		85		
Weight		3.6		g	

NOTES: 1. The maximum total current, IOHmax and IOLmax, for all outputs combined, should not exceed ± 12 mA to hold the maximum

voltage drop specified.

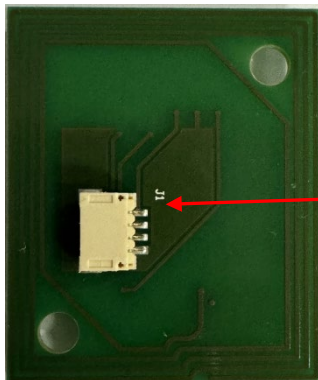
2. The maximum total current, IOHmax and IOLmax, for all outputs combined, should not exceed ± 48 mA to hold the maximum

voltage drop specified

- **ANTENNA SPECIFICATION**

Item	Min.	Typical	Max.	Unit	Condition
Frequency		13.56		MHz	
Impedance		50		ohm	
MAX Power			200	mW	
Electrical Type					Loop Antenna

PIN DESCRIPTION



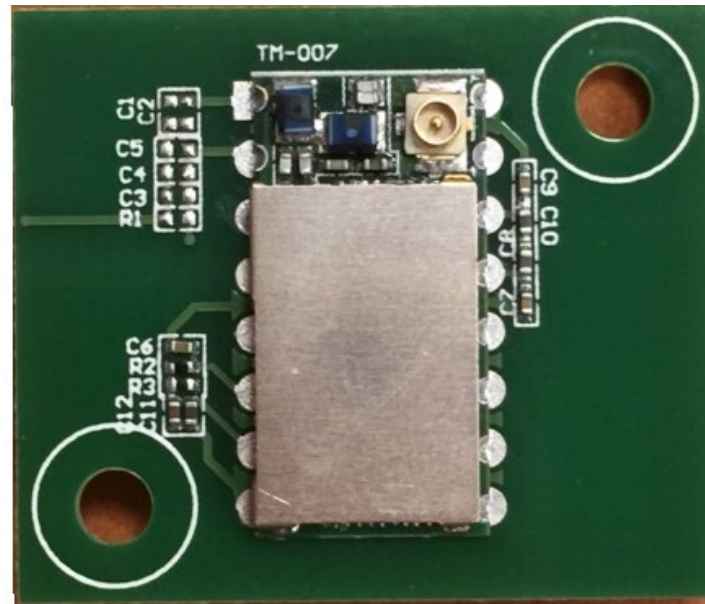
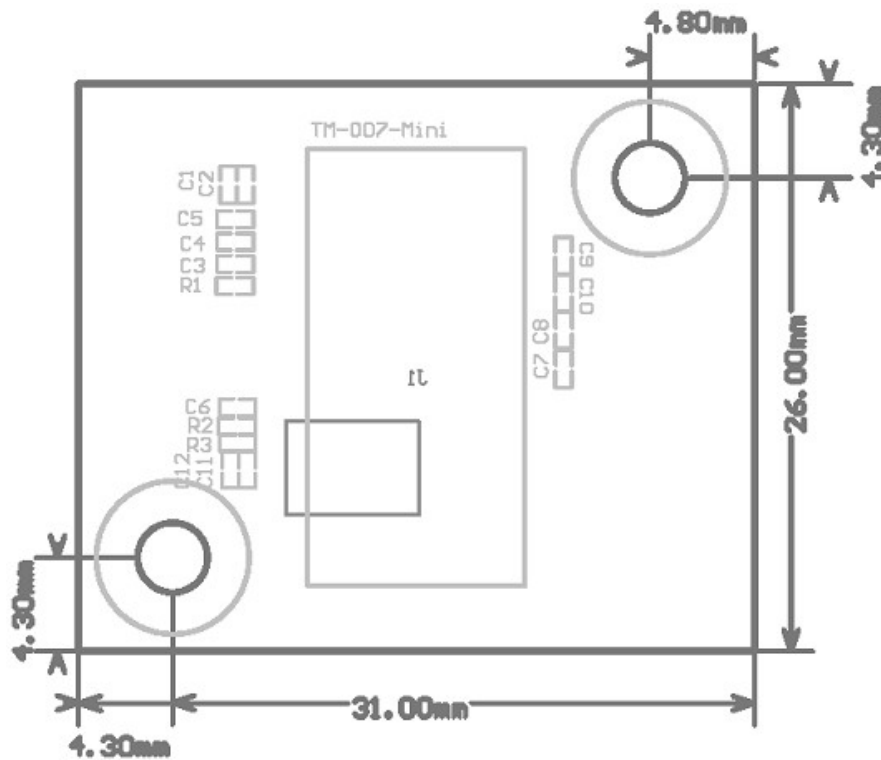
Pin1

J1 Connector

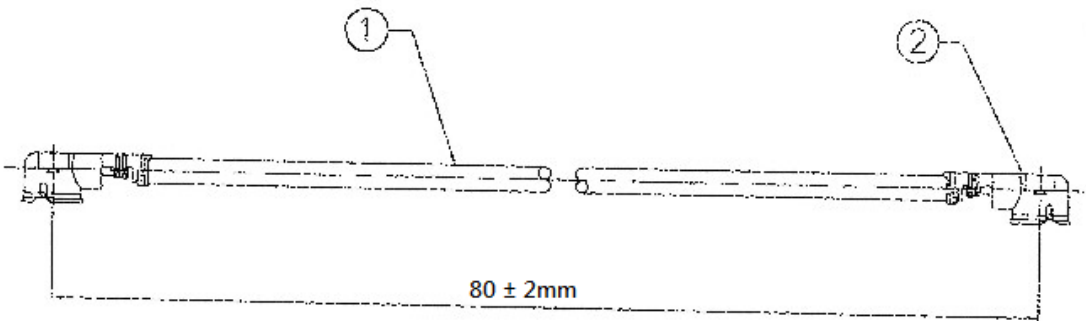
Pin	Name	I/O	Condition
1	VCC	PWR	Serial data input
2	TXD	O	Transmit data
3	RXD	I	Receive data
4	GND	PWR	Ground

• DIMENSIONS

TM-007 Mini module : 10mm x 20mm x 1.888mm



Cable Length: 80mm



ITEM	Description	P/N	Color	Q'ty
1	Cable Ø1.13	1302213002	Gray	1
2	I-PEX 20278-113	636131902	Gold	2

Antenna : 50mm x 12mm x 1.85mm



FCC

This module has been tested and found to comply with the following requirements for Modular Approval.

Part 15.225 Operation within the band 13.110–14.010 MHz (NFC)

(KDB 996369 D03 section 2.2 List of applicable FCC rules)

RF exposure considerations

This equipment complies with FCC mobile radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. A separate SAR/Power Density evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

Antennas

This radio transmitter has been approved by the FCC and ISED to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antennes

Cet émetteur radio a été approuvé par la FCC et ISED pour fonctionner avec les types d'antennes répertoriés ci-dessous avec le gain maximal autorisé indiqué. Les types d'antennes non inclus dans cette liste, ayant un gain supérieur au gain maximum indiqué pour ce type, sont strictement interdits pour une utilisation avec cet appareil.

Radio	Antenna Type	Freq. (MHz)
NFC	PCB Loop antenna	13.56

(KDB 996369 D03 section 2.7 Antennas)

2.3 Summarize the specific operational use conditions

The module is tested for standalone mobile RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) will need a separate reassessment through a class II permissive change application or new certification.

2.4 Limited module procedures

Not applicable, this device is a single modular approval and meets FCC 47 CFR 15.212 requirement.

2.5 Trace antenna designs

Not applicable. This module has its own antenna, and does not need a host's printed board micro strip trace antenna, etc.

IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

OEM/Host manufacturer responsibilities

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment.

Required End Product Labeling

Any device incorporating this module must display an external, visible, permanently affixed label with the FCC ID and the ISSED certification number preceded by the term as follows.

“ **Contains FCC ID: VTV-TM007MINI**”

“ **Contains IC: 10524A-TM007MINI** ”

Obligation d'étiquetage du produit final:

Tout appareil intégrant ce module doit afficher une étiquette externe, visible et apposée en permanence avec le numéro de certification ISDE précédé du terme comme suit.

« **Contient IC : 10524A-TM007MINI** »

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as shown in User manual.

(KDB 996369 D03 section 2.8 Label and compliance information)

Test Modes (FCC)

This device uses various test mode programs for test set up which operate separate from production firmware. Host integrators should contact the grantee for assistance with test modes needed for module/host compliance test requirements.

(KDB 996369 D03 section 2.9 Information on test modes and additional testing requirements)

Additional testing, Part 15 Subpart B disclaimer (FCC)

The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.

The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

(KDB 996369 D03 section 2.10 Additional testing, Part 15 Subpart B disclaimer)

Note EMI Considerations

Note that a host manufacturer is recommended to use KDB996369 D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

For standalone mode, reference the guidance in KDB996369 D04 Module Integration Guide and for simultaneous mode; see KDB996369 D02 Module Q&A Question 12, which permits the host manufacturer to confirm compliance.

(KDB 996369 D03 section 2.11 Note EMI Considerations)

How to make changes

Only Grantees are permitted to make permissive changes, if the module will be used differently than granted conditions, please contact us to ensure modifications will not affect compliance.

(KDB 996369 D03 section 2.12 How to make changes)

FCC

15.19

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- 1) this device may not cause harmful interference and
- 2) this device must accept any interference received, including interference that may cause undesired operation.

Federal Communications Commission (FCC) Statement

15.105(b)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

15.21

You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. For portable operation, this device has been tested and meets FCC RF exposure guidelines. When used with an accessory that contains metal may not ensure compliance with FCC RF exposure guidelines.

ISED

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement

économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radiation Exposure Statement:

This equipment complies with ISSED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with greater than 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements ISSED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à plus de 20 cm entre le radiateur et votre corps.

This device is intended only for OEM integrators under the following conditions: (For module device use)

- 1) The antenna must be installed and operated with greater than 20cm between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna. As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)

- 1) L'antenne doit être installée et exploitée avec plus de 20 cm entre l'antenne et les utilisateurs, et
- 2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne. Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or colocation with another transmitter), then the Canada authorization is no longer considered valid and the IC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

IMPORTANTENOTE

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canadan'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir à l'utilisateur final des informations concernant la procédure d'installation ou de suppression de ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations / avertissements réglementaires requis, comme indiqué dans ce manuel.

NCC

1. 此模組於取得認證後將依規定於模組本體標示審驗合格標籤，並要求平台廠商於平台上標示
2. 『內含發射器模組：CCXXxxLPyyyZzW』
3. 或相似含意的標示
4. 根據 NCC LP0002 低功率射頻器材技術規範_章節 3.8.2：
5. 取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
6. 低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
7. 前述合法通信，指依電信管理法規定作業之無線電通信。
8. 低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

