IDENTIFICATION

INSTALLATION

ID ISC.MU02.02

UHF Reader Module

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FEIG ELECTRONIC

Note

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With the edition of this document, all previous editions become void. Indications made in this manual may be changed without previous notice.

Composition of the information in this document has been done to the best of our knowledge. FEIG ELECTRONIC GmbH does not guarantee the correctness and completeness of the details given in this manual and may not be held liable for damages ensuing from incorrect or incomplete information. Since, despite all our efforts, errors may not be completely avoided, we are always grateful for your useful tips.

The instructions given in this manual are based on advantageous boundary conditions. FEIG ELECTRONIC GmbH does not give any guarantee promise for perfect function in cross environments and does not give any guaranty for the functionality of the complete system which incorporates the subject of this document.

FEIG ELECTRONIC call explicit attention that devices which are subject of this document are not designed with components and testing methods for a level of reliability suitable for use in or in connection with surgical implants or as critical components in any life support systems whose failure to perform can reasonably be expected to cause significant injury to a human. To avoid damage, injury, or death, the user or application designer must take reasonably prudent steps to protect against system failures.

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General information's regarding this document

- The sign "☞" indicates extensions or changes of this manual compared with the former issue.
- If bits within one byte are filled with "-", these bit spaces are reserved for future extensions or for internal testing- and manufacturing-functions. These bit spaces must not be changed, as this may cause faulty operation of the reader.
- The following figure formats are used:
  0...9: for decimal figures
  0x00...0xFF: for hexadecimal figures,
  b0...1 for binary figures.
- The hexadecimal value in brackets "[ ]" marks a control byte (command).

Contents

1. Safety Instructions / Warning - Read before start-up !

- The device may only be used for the intended purpose designed by for the manufacturer.
- The operation manual should be conveniently kept available at all times for each user.
- Unauthorized changes and the use of spare parts and additional devices which have not been sold or recommended by the manufacturer may cause fire, electric shocks or injuries. Such unauthorized measures shall exclude any liability by the manufacturer.
- The liability-prescriptions of the manufacturer in the issue valid at the time of purchase are valid for the device. The manufacturer shall not be held legally responsible for inaccuracies, errors, or omissions in the manual or automatically set parameters for a device or for an incorrect application of a device.
- Repairs may only be executed by the manufacturer.
- Installation, operation, and maintenance procedures should only be carried out by qualified personnel.
- Use of the device and its installation must be in accordance with national legal requirements and local electrical codes .
- When working on devices the valid safety regulations must be observed.
- Special advice for carriers of cardiac pacemakers:
  Although this device doesn't exceed the valid limits for electromagnetic fields you should keep a minimum distance of 25 cm between the device and your cardiac pacemaker and not stay in an immediate proximity of the device respective the antenna for some time.

2. Performance Characteristics of the ID ISC.MU02.02 Reader Module

2.1. Performance Characteristics

The ID ISC.MU02.02 Reader Module is designed for reading and writing passive transponders, so-called “Smart Labels”, with an operating frequency of 860 MHz to 960 MHz. It is suitable for any application in which short and middle read ranges and small reader dimensions are required.

The module has 2 integrated antenna outputs for connecting 2 different 50 Ω antennas.

2.2. Available module types

The following module types are currently available:

Table 1: Available reader types

Module type	Description
ID ISC.MU02.02-AD	Reader Module with RS232 and data/clock interface, external supply voltage of 5 V DC
ID ISC.MU02.02-CU	Reader Module with RS232-LVTTL and USB interface, external supply voltage of 5 V DC or directly over USB

2.3. Optional available

The following components are optional available for the ID ISC.MU02.02.

Table 2: Accessories

Accessories	Order number
For COM-Port connection:	
ID CAB.A-A Cable for Adaption of RS232 and Data/Clock	2259.000.00
ID CAB.RS-A Cable for RS232 and Power supply	1690.000.00
RS232-LVTTL/TTL Serial Data Converter	1962.000.00
ID Net.5V Power Supply	1689.000.00
For USB-Port connection:	
ID CAB.USB-B Cable for USB	3541.000.00
Antennas and accessories:	
ID ISC.ANT.U75/50-EU UHF antenna module 865 – 868 MHz	3544.000.00
ID ISC.ANT.U75/50-FCC UHF antenna module 902 – 928 MHz	3543.000.00
ID ISC.ANT.C05-A UHF antenna cable U.FL-U.FL 500 mm	3540.000.00
ID ISC.ANT.C02-U.FL/SMA adapter cable U.FL-SMA 200 mm	3621.000.00

3. Installation and wiring

3.1. Dimensions

Figure 1 shows the dimensions of the ID ISC.MU02.02 Reader Module in mm.

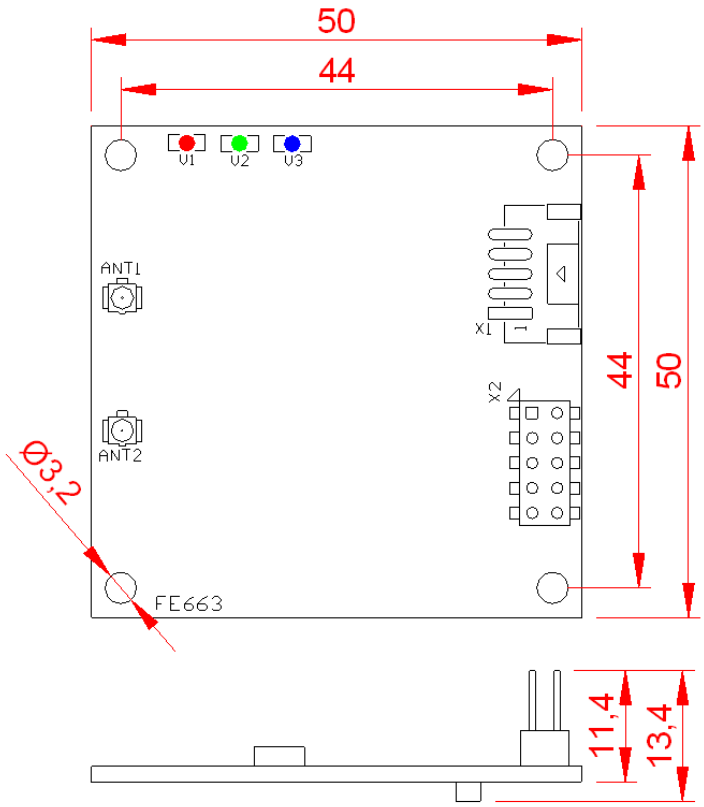

Figure 1: Dimensions of the ID ISC.MU02.02 Reader Module in mm

3.2. Wiring – Connector X2

Figure 2 and Table 1 show the pin assignments for Terminal X2. The pin connector is designed for flat cable connection using an IDC multipoint socket connector with 2.54 mm pin spacing.

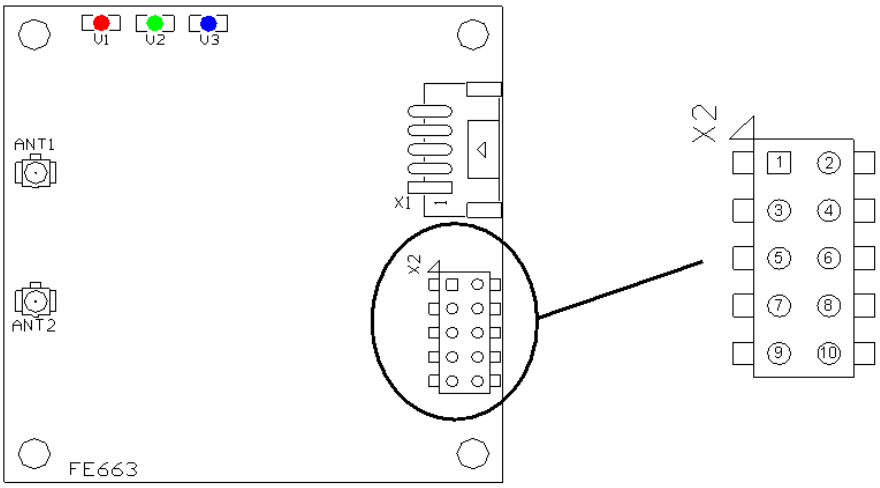

Figure 2: Pin assignments for Terminal X2

Table 3: Pin assignments for Terminal X2

Pin	Function	Description
1	DAT	Data line for the data/clock interface
2	CLK	Clock line for the data/clock interface
3	TxD	RS232-TTL – Transmit Data
4	GND **	Ground
5	RxD	RS232-TTL – Receive Data
6	SHDN	Shut Down
7	CLS	CLS line for the data/clock interface
8	VCC *	+ 5 V DC
9	GND **	Ground
10	---	no function (use ONLY open!)

* Use only regulated DC power supplies !
** GND-Pins 4 and 9 are to be connected directly to each other on the Reader Module

3.2.1. Supply voltage

The ID ISC.MU02.02 must be supplied only by a regulated power supply. If switching power supplies are used with the module, be sure that there is adequate filtering. Noise from the power supply can result in a reduction of the read/write range of the module. The cable length from the power supply should be as short as possible, and should in any case not exceed 3 m.

Table 4: Pin assignment for the Power Supply at terminal X2

X2 Pin no.	Function	Description
8	VCC *	+ 5 V DC ± 5%
4, 9	GND **	Ground
* Use only regulated power supplies ! ** GND-Pins 4 and 9 are to be connected directly to each other on the Reader Module		

NOTE:

The reader has to be supplied by a limited power supply (e.g. NEC Class 2/LPS power supply) according EN 62368-1 chapter Q.1, only.

Reversing the polarity of the supply voltage may destroy the device.

Supply voltages outside the specifications may destroy the device.

3.2.2. RS232 interface

The length of the cable to the RS232 interface should be kept as short as possible, and must in any case not exceed 3 m.

Table 5: Pin assignments for the RS232 interface at terminal X2

X2 Pin no.	Function	Description
3	TxD *	RS232 - Transmit Data
4, 9	GND **	Ground
5	RxD *	RS232 - Receive Data
* Signal names as seen by the Reader Module. ** GND-Pins 4 and 9 are to be connected directly to each other on the Reader Module		

The transmission parameters for the interface can be software-configured. Table 6 shows the standard parameters for the RS232 interface.

Table 6: Standard parameters of the RS232 interface

Parameter	Standard setting
Baud rate	38400
No. of data bits	8
Parity	Even
No. of stop bits	1

NOTE:

IF there is a RS232 to TTL converter used without external power supply it may be necessary to switch on the COM Port parameter "RTS" and "DTR" manually.

3.2.3. Data/Clock interface

The length of the cable to the data/clock interface should be kept as short as possible. It must not exceed 3 m.

Table 7: Pin assignment for the Data/Clock interface at Terminal X2

X2 Pin no.	Function	Description
1	DAT	Data line for the data/clock interface
2	CLK	Clock line for the data/clock interface
7	CLS	CLS line for the data/clock interface
4, 9	GND *	Ground
* GND-Pins 4 and 9 are to be connected directly to each other on the Reader Module		

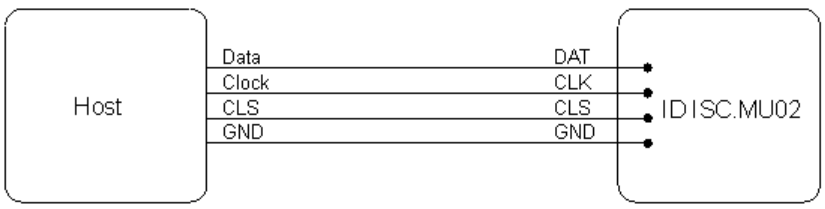

Figure 3: Connecting the data/clock interface

3.2.4. Shut Down

The ID ISC.MU02.02 can be switched off with the SHDN pin (pin no. 6 at terminal X2). Therefor the pin has to be connected to Ground.

Table 8: Status table for the SHDN pin

X2 Pin no. 6	Operating status
not connected	on
Ground (GND)	off

NOTE:

Supply voltages outside the specifications may destroy the device.

3.3. USB interface

Figure 4 and Table 9 show the pin assignments for Terminal X1 (“JST PH” type with pitch 2.0 mm).

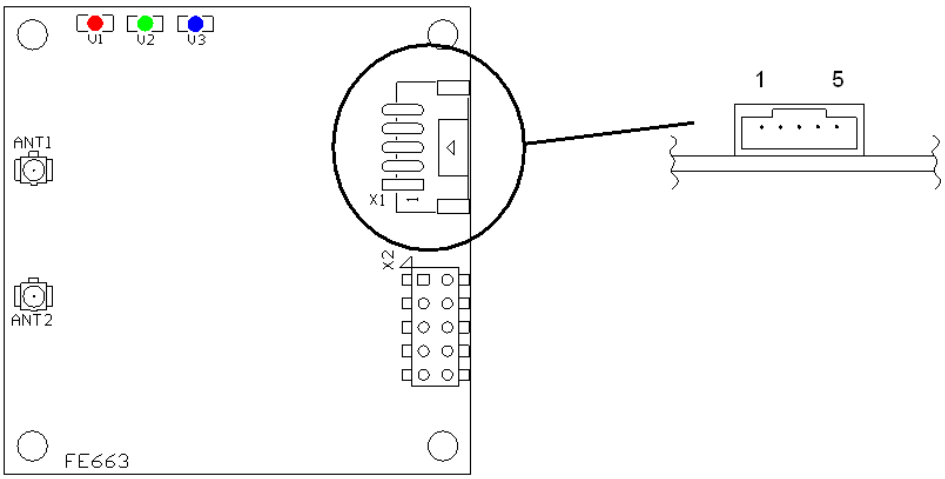

Figure 4: Pin assignments for Terminal X1

Table 9: Pin assignments for Terminal X1

Pin	Function	Description
1	SHIELD	Shielding
2	GND	Ground
3	D +	USB-D PLUS
4	D –	USB-D MINUS
5	VCC	5 V power supply

The power supply follows though the USB-interface (Bus powered). The USB interface must support a current of 500mA (High Powered Interface). The data rate of the reader is reduced to 12 Mbit (USB high speed). If the reader is used for the first time, it must be registered in the operating system of the computer. For this the instruction "M70700-xde-ID-B: Installation OBID® USB driver" can be used.

NOTE:

If the ID ISC.MU02.02 is USB powered there MUST NOT connected a power supply to terminal X2.

3.4. Antenna ports

There can be 2 antennas connected to the ID ISC.MU02.02 at the antenna ports ANT1 and ANT2. Figure 5 shows the position of the “Hirose U.FL” receptacles with an input impedance of 50 Ω. The antennas can be switched by software.

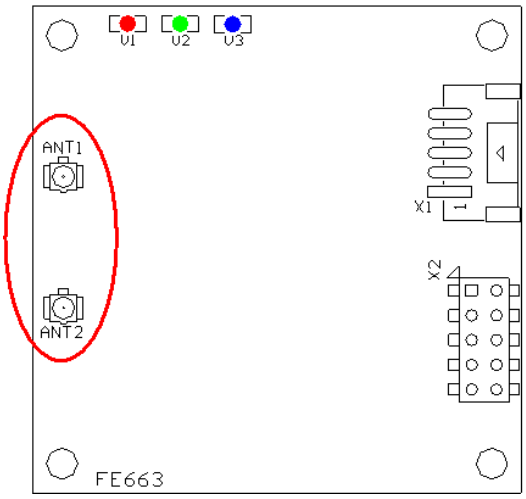

Figure 5: Antenna ports ANT1 and ANT2

3.5. Display elements

The ID ISC.MU02.02 Reader Module has a red LED (V1) and a green LED (V2) and a blue LED (V3) which are used as display elements (Figure 6).

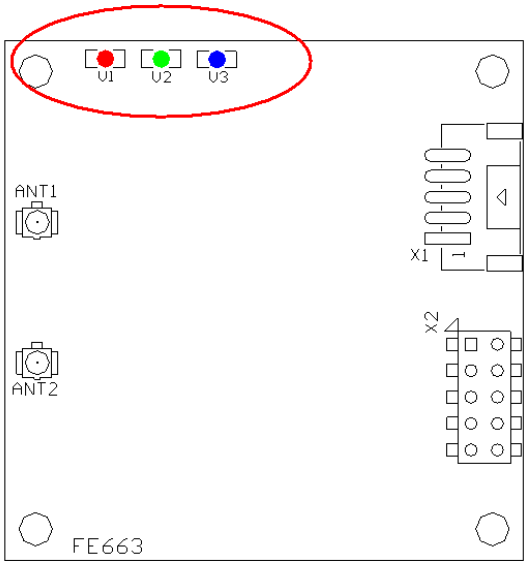

Figure 6: Position of the LEDs

The functions of both LEDs V2 and V3 can be configured using software protocol. It is also possible to control all 3 LEDs directly using an additional software protocol.

Table 10 shows the standard setting for the LEDs.

Table 10: Standard setting for the LEDs

LED	Color	Standard setting
V1	Red	• Flashes 5x after a reset. • Off during normal operation. • Flashing alternately with V2 during failure status.
V2	Green	• Flashes 5x after a reset. • On during normal operation. • Off for 1 second after successful communication with a transponder. • Flashing alternately with V1 during failure status.
V3	Blue	• Flashes 10x after a reset. • Comes on for 1 second after successful communication with a transponder.

3.6. Installation notes

Be aware of the following possible environmental factors when installing an ID ISC.MU02.02 into another device :

- Effects from nearby metal objects
  ⇒ Detuning of the antenna
  ⇒ Impaired propagation of the antenna's electromagnetic field
- EMC effects on cables
  ⇒ Impaired communication between reader and transponder

3.6.1. Metallic surroundings

When installing an ID ISC.MU02.02 into another device, be sure that there are no metal surfaces or objects in the direct vicinity of the connected antennas if possible. These can detune the antenna and impair the propagation of the electromagnetic field due to reflections. This will in turn result in reading holes and overshoots.

The distance between the antennas and a metal surface should be at least 5 cm. Note that even other circuit boards may act line metal objects depending on how much copper they contain.

If a metallic surrounding cannot be avoided, stable function should at least be ensured by keeping the distance as great as possible.

The area between the antenna and transponder as well as the area on the other side of the transponder should also be kept clear of metal parts.

3.6.2. EMC effects on cables

In spite of the internal EMC filters inside the reader, high levels of noise on the supply voltage can result in impairment of the communication between the reader and transponder.

When installing an ID ISC.MU02.02 into another device, be sure therefore that a clean, noise-free power supply is used.

4. Technical Data

MECHANICAL DATA

Dimension (W x H x D)	50 mm x 50 mm x 14 mm (1.97 inch x 1.97 inch x 0.55 inch)
Weight	10 g (0.02 lb)
Connector	10-pin connector, spacing 2.54 mm (0,1 inch) 5-pin connector, type “JST PH” pitch 2 mm (0,079 inch)

ELECTRICAL DATA

Power Supply	5 V DC ± 5 %
Power Consumption	max. 2 W
Operating Frequency	860 MHz to 960 MHz
RF-Power	max. 170 mW, configurable
Antenna Connection	2 x “Hirose U.FL” receptacles, 50 Ω; internal Multiplexer
Interfaces	
• ID ISC.MU02.02-AD • ID ISC.MU02.02-CU	RS232-V24, Data/Clock RS232-LVTTL, USB

FUNCTIONAL PROPERTIES

Protocol Modes	• FEIG ISO HOST Mode (Advanced Protocol Frame) • Scan Mode
Supported Transponder Types	EPC Class 1 Generation 2 ISO 18000-6-C (Upgrade Code required)
Optical Indicators	3 LEDs for operating status and analysis (red, green, blue)

AMBIENT CONDITIONS

Temperature Range	
• Operation	-25 °C to +55 °C (-13°F to 131 °F)
• Storage	-25 °C to +85 °C (-13°F to 185 °F)
Humidity	5 % to 95 % non-condensing

APPLICABLE STANDARDS

Radio Regulation	
• Europe	EN 302 208
• USA	FCC 47 CFR Part 15
• Canada	IC RSS-Gen, RSS-210
EMC	EN 301 489
Safety	EN 60950

* Caution: Overheating of the device may result in performance losses. It is recommended to activate the RF of the reader only if there is a transponder in the detection range of an antenna.

5. Radio Approvals

5.1. Europe (CE)

Hereby, FEIG ELECTRONIC GmbH declares that the radio equipment type ID CPR74 is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:

http://www.feig.de/en/downloads-support/declarations-of-conformity.html

Performance Classification according to ETSI EN 301 489: Class 2

5.2. USA (FCC) and Canada (IC)

5.2.1. USA (FCC) and Canada (IC) warning notices

Product name:	**ID ISC.MU02.02-AD** **ID ISC.MU02.02-CU**
Reader name:	**ID ISC.MU02.02-AD** **ID ISC.MU02.02-CU**
FCC ID: **IC:**	**PJMMU02** **6633A-MU02**
Notice for USA and Canada	This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada. 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. Unauthorized modifications may void the authority granted under Federal communications Commission Rules permitting the operation of this device. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Le présent appareil est conforme aux CNR d'Industrie 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.

Warning: Changes or modification made to this equipment not expressly approved by FEIG ELECTRONIC GmbH may void the FCC authorization to operate this equipment.

5.2.2. Label Information

The following information must be placed at the outer side of the housing in which the reader is mounted.

Contains FCC ID PJMMU02
Contains IC: 6633A-MU02

5.2.3. Installation with FCC / IC Approval

FCC-/IC-NOTICE: To comply with FCC Part 15 Rules in the United States / with IC Radio Standards in Canada, the system must be professionally installed to ensure compliance with the Part 15 certification / IC certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States / Canada.

5.2.4. USA (FCC) and Canada (IC) approved antennas

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with maximum permission gain and required antenna impedance for each antenna type 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

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne 'énoncé ci-dessus et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

Following antennas are approved by FCC according FCC Part 15 and IC Canada according RS210

- ID ISC.ANT.U170/170-FCC
- ID ISC.ANT.U100/75-FCC
- ID ISC.ANT.U75/50-FCC