

Annex no. 5

Functional Description / User Manual

Project Documentation | EKTSDG-010000 Target Simulator Doppler Generator

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Handheld Radar Target Simulator Doppler Generator

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1 Document Revision History

Table 1-1: Document Revision History

Date	Editor	Description
2012-02-08	Michaelis	Initial design of document
2012-03-21	Mende	Review
2012-06-07	Hadasch	Added chapter 7: Declaration of conformity for USA

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2 Overview

The EKTSDG-010000 (Elektronic K-band Target Simulator/ Doppler Generator) is a handheld portable moving target simulator for K-band Radar transceivers. It can be used for calibrating and testing speed displays, door openers, safety systems and other radar based Doppler sensors. The EKTSDG-010000 uses a linear polarized antenna.

A software generated modulation signal allows generation of low distortion and directional Doppler signals from 44Hz to 9kHz corresponding to speeds from 1km/h to 200km/h.

2.1 Features

- Handheld K-Band Target Simulator Doppler Generator
- Programmable Speed Interval 1 ... 200km/h
- Programmable Movement Direction
- Programmable Signal Level
- Programmable Presets
- Rechargeable Accumulator
- Standalone or Hosted Operation
- USB Interface to Hostcomputer
- Compact and Rugged Construction
- EKTSDG-Remote PC Software included

2.2 Applications

- Mobile Test Equipments
- Production Final Inspection
- Incoming Components Inspection
- System Tuning and Adjustment

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3 Getting Started

This chapter explains the first steps of using the EKTSDG device and the EKTSDG-Remote Software.

3.1 Equipment Needed

- EKTSDG Device
- USB Stick with EKTSDG-Remote Software
- PC with Windows 2000/XP/Vista/7

3.2 EKTSDG-Remote Software

EKTSDG may be connected via USB to any Windows PC. The included EKTSDG-Remote software allows realtime remote controlling and configuring the presets of the EKTSDG.

3.3 Installing from USB Stick

1. Remove any EKTSDG system connected to your system
2. Insert USB memory stick and start `setup.exe`.
If your computer does not already contain the actual LabVIEW runtime engine, you will be asked to accept licences of National Instruments.
3. If possible, accept all default program locations. Troubleshooting will be simplified like this.
4. Please be patient while LabVIEW runtime system is being installed.
5. You will find the EKTSDG under START->PROGRAMS->SmartMicro->EKTSDG-Remote
6. Plug your EKTSDG system to a USB port of your PC. There should appear a "New USB Hardware Found" message from Windows.
7. Windows will ask you for a hardware driver. Select to install it manually and chose the drive letter of the USB stick. Ignore the Windows logo test message.
8. Start EKTSDG-Remote Software.

As soon as the EKTSDG system has been connected, the search LED stops flashing and EKTSDG-Remote software is ready.

If EKTSDG Hardware will not be found, please reinstall the hardware driver and try again.

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3.4 EKTSDG-Remote Screen

After launching the EKTSDG-Remote Software, the screen below should appear.

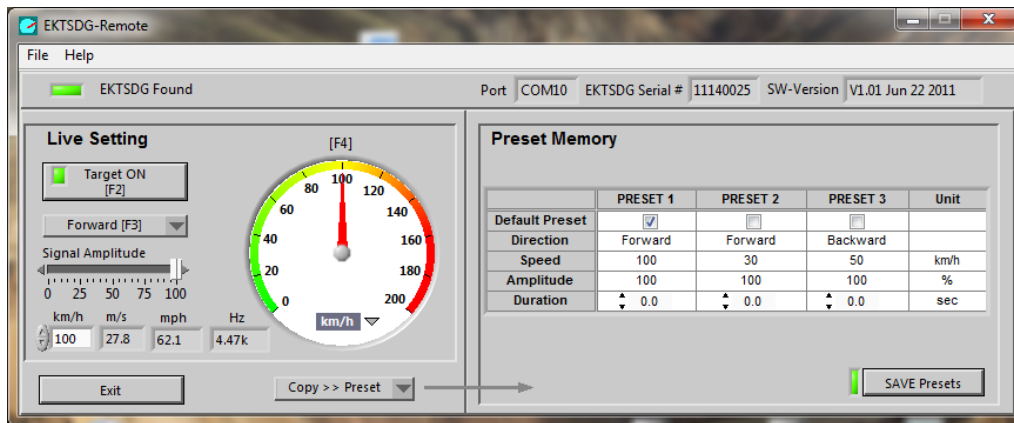


Figure 1: EKTSDG-Remote Screen

See section 3.2 for details on this software.

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4 EKTSDG Handheld Operation

4.1 Controls

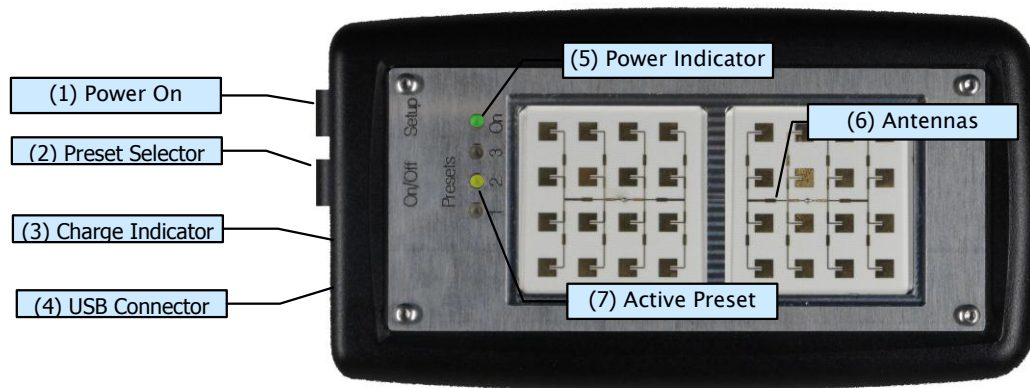


Figure 2: Controls and Displays

4.2 Using EKTSDG

4.2.1 General Remarks

Prepare the settings as described in section 5.2. Maximum distance depends on the radar sensitivity and the amplitude settings of EKTSDG.

4.2.2 Power Indicator and Charging

When you are using the EKTSDG without a USB connection the power indicator (5) begins only to blink if the power of the battery is too low. → Connect the EKTSDG over USB with a PC to charge the accumulator. The charge indicator (3) turns on when you connect and turns off when the accumulator is fully loaded. If the charge indicator blinks the accumulator generates a fail and must be changed.

4.2.3 Using Default Preset

The default preset will be executed, until the programmed duration elapses.

1. Align the antenna (6) against the transceiver
2. Press the Power switch (1) for 0.5 seconds
 - > EKTSDG begins simulating the programmed speed, amplitude and direction
 - > EKTSDG stops after the programmed duration or after switching off manually with (1)

4.2.4 Selecting Another Preset

The selected preset will become the new default preset and will be executed, until the programmed duration elapses:

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1. Press Power switch (1) **while** pressing the Preset selector (2)
 - > EKTSDG default preset LED (7) blinks
1. Repeat pressing the Preset selector (2) until the desired preset LED (7) flashes
 - > after 1 second, the selected LED (7) stops blinking and EKTSDG runs the selected preset
 - > the selected preset will become the new default preset

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5 EKTSDG-Remote Software

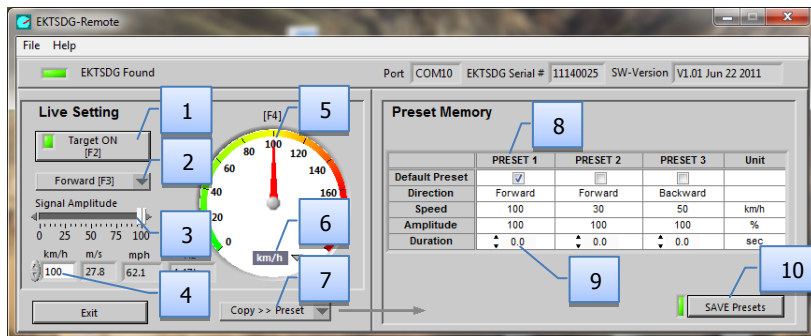


Figure 3: EKTSDG-Remote Software Screen

Legend of Controls:

1. Doppler Signal ON/OFF
2. Direction of Movement
3. Doppler Amplitude (simulates object distance)
4. Object Speed parallel to (5)
5. Object Speed parallel to (4)
6. Select Speed Display Unit
7. Copy Settings to Preset Memory
8. Select Standard Preset
9. Duration of Doppler Signal
10. Save Presets to EKTSDG

This software allows real time control and configuring the EKTSDG target. You can get help by moving the mouse over the control elements. Menu „Help-Show Context Help“ opens a small window with additional information.

5.1 Remote Controlling EKTSDG

EKTSDG may be remotely controlled by the EKTSDG-Remote software. The realtime remote control part is called Live Setting on the left half of the Software panel. Please connect EKTSDG to a USB port before changing any controls.

5.1.1 Switching ON/OFF

Click [Target ON] key (1) to toggle speed simulation on and off. Shortcut key [F2].

5.1.2 Setting Speed

Speed setting may be controlled by different methods:

- Move needle (5)
- Type value or use spin controls in (4)
- Use [PageUp] and [PageDown] keys on PC keyboard
- Shortcut key: [F4], then cursor up/down

5.1.3 Setting Movement Direction

Toggle the direction with control (3). This control changes the sign of the 90° phase shift between the I and Q channel.

Note: Direction is only detectable by „stereo“ k-band radar sensors.

5.1.4 Setting Signal Amplitude

Simulate object distances by adjusting the signal amplitude (3).

This may be useful for testing system sensitivity.

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5.2 Configuring EKTSDG

EKTSDG starts up with a “default preset”. This is one of three configurable presets. All presets can be configured by means of the EKTSDG-Remote software or with a terminal software.

Default preset can also be selected manually directly with the EKTSDG. See section 4.2.4.

5.2.1 Storing Settings as Presets

1. Select the desired parameters in the Live Setting section with controls (1) to (6)
2. Copy these parameters to the desired preset with selector (7)
3. **Save presets** with control (10)

5.2.2 Set Signal Duration

The EKTSDG sends a Doppler signal, until signal duration has elapsed and then switches off.

1. For each preset, you may select an individual duration with control (9).
Value range is 0.1 to 60sec. Value 0 means 'unlimited'
2. **Save presets** with control (10)

5.2.3 Set Default Preset

Default preset will be active after normal power on of the EKTSDG. It may later be altered directly at the EKTSDG.

1. Select default preset with (8)
2. **Save presets** with control (10)

5.3 Getting Help

Get help by selectig Menu-Help.

Get tips by moving cursor over the controls.

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6 EKTSDG USB Serial Interface

EKTSDG can optionally be operated by a terminal program or by customer software. The USB port is represented as serial interface by the driver software, that has been installed according to section 3.3.

1. Connect EKTSDG
2. Start EKTSDG-Remote software or check the windows control panel to get the assigned COM port. Close EKTSDG-Remote software before opening terminal software!
3. Open a terminal program like Windows Hyper Terminal
4. Select the appropriate COM port. All other settings are not used.
5. Press [Enter]. Now, the following screen (Fig. 4) should appear:

6.1 Terminal Mode: Remote Control

```

EKTSDG 24GHZ Doppler Target #09200100
=====
Program Version V1.00 Aug 21 2009

Default Preset          :    1          [0=none, 1..3=Preset]

[d] Direction of Motion :    0          [0=Forward, 1=Backward]
[s] Speed                :    3          [001..200km/h]
[r] Reach                :   100        [001..100%]
[t] Target on/off       :    1          [0=off, 1=On]

[p] Presets Setup
[x] Back to manual mode

->

```

Figure 4: EKTSDG Terminal Remote Control Dialog

These settings are directly executed, as long as EKTSDG remains connected to the USB port. With [p], you will be able to configure the preset memory.

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6.2 Terminal Mode: Preset Setting

For using presets please refer to section 4.2.

```

Presets Setup Page
=====
[q] P1 Direction of Motion : 0 [0=Forward, 1=Backward]
[w] P1 Speed : 3 [001..200km/h]
[e] P1 Reach : 100 [001..100%]
[r] P1 Time : 0 [001..600x100ms, 0=endless]

[t] P2 Direction of Motion : 0 [0=Forward, 1=Backward]
[z] P2 Speed : 113 [001..200km/h]
[u] P2 Reach : 100 [001..100%]
[i] P2 Time : 60 [001..600x100ms, 0=endless]

[o] P3 Direction of Motion : 0 [0=Forward, 1=Backward]
[p] P3 Speed : 9 [001..200km/h]
[a] P3 Reach : 100 [001..100%]
[s] P3 Time : 10 [001..600x100ms, 0=endless]

[c] Default Preset : 1 [0=none, 1..3=Preset]
[l] Save and Leave Preset Setup

->
  
```

Figure 5: EKTSDG Preset Terminal Dialog

Refer to section 5.2 for parameter explanations.

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7 Declaration of Conformity for USA

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.

Usually this is followed by the following FCC caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Note: 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 interferences 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 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.

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7.1 FCC Label



Figure 6: FCC Label

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8 Contact

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