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	draft	1.2
Titel : Configuration and Operation manual, kronback tracers S16		23/09/2019

Configuration and Operation manual



Kronback tracers S16

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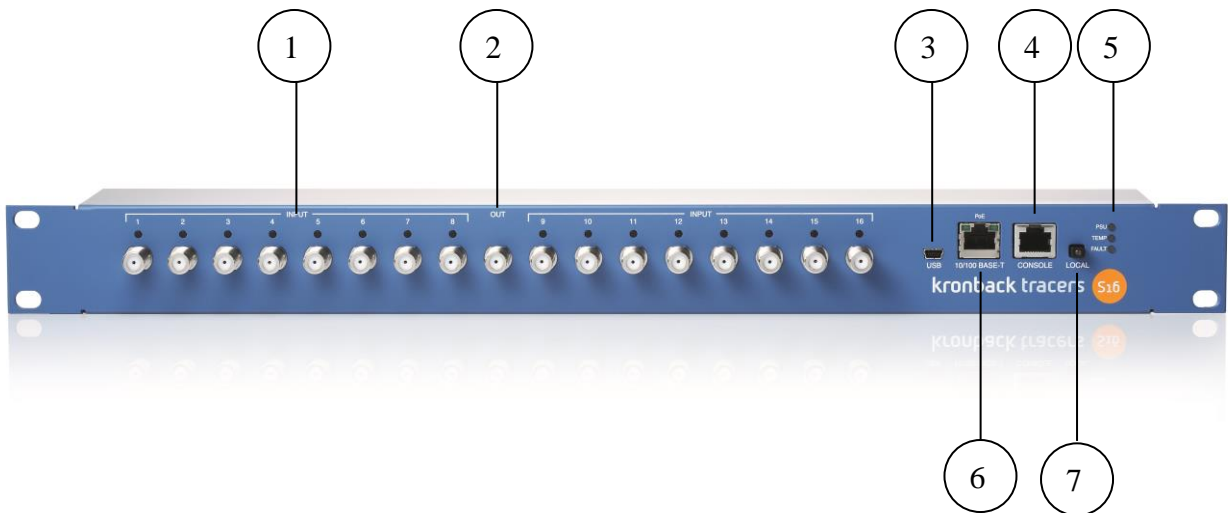
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1. Physical connections

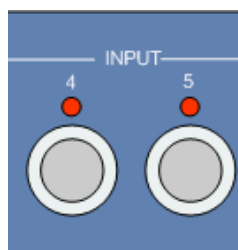


- 1 INPUT CONNECTOR AND LED
- 2 OUTPUT CONNECTOR
- 3 USB CONNECTOR
- 4 CONSOLE CONNECTOR
- 5 STATUS LED
- 6 ETHERNET CONNECTOR
- 7 LOCAL CONTROL BUTTON

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1.1. Input connector and LED



The 16 F-type input connectors are mechanically fixed in the chassis front by a double D-cut hole.

The connectors can withstand torques > 4.5 Nm (40 lb*inch)

Over each connector is a red LED that indicates which of the 16 input connectors that are active.

All input connectors are DC blocked up to 10V

All F-connectors are high quality CABLECON type.

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1.2. Output connector



The F-type output connector is mechanically fixed in the chassis front by a double D-cut hole.

The connector can withstand torques > 4.5 Nm (40 lb*inch)

The output connector is DC blocked up to 10V

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1.3. USB connector



The USB type mini-B connector is used for control of the **S16**.

The protocol follows the HID standard (Human Interface Device), and requires no driver software installed on the connected PC.

A control program can be downloaded from www.kronback.com/s16usb.zip

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1.4. Console connector



The console interface is used for configuring the basic IP parameters of the **S16**. The connector is a standard RJ45 type.

1.4.1. RS232 parameters

RS232 parameter	Value
Baud rate	9600 bps
Data bits	8
Parity	None
Stop bit	1
Flow control	None

1.4.2. Connector pinout

pin	function
1	NC
2	NC
3	S16 data TX
4	ground
5	ground
6	S16 data RX
7	Programming use, connect to ground
8	Programming use, connect to ground

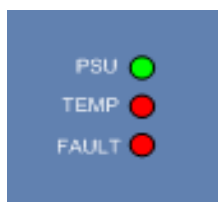
1.4.3. Console cable pinout

S16 RJ45 pin	direction	PC RS232 dsub9 female	Function
3	→	2	S16 data TX
4		5	ground
5		5	ground
6	←	3	S16 data RX
7		5	ground
8		5	ground

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1.5. Status LEDs



3 Status LEDS are present on the **S16** front.

1.5.1. PSU LED

The PSU LED is directly connected to the internal power circuit. This LED must always be on.

1.5.2. TEMP LED

This LED lights if the internal temperature of **S16** exceeds +60 °C [140 °F].

1.5.3. FAULT LED

This indicates that the internal watch dog circuit is not being triggered. This indicates a CPU fault.

During power up this LED blinks 2-3 times

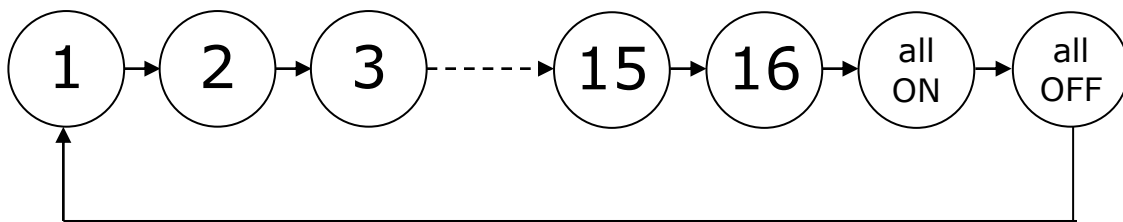
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1.6. Local button

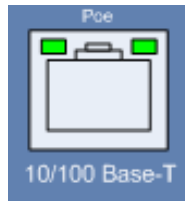


The Local button is used for front panel operation. For each push the selected input increments by 1. After input 16 the All-on combiner mode is selected followed by all-off mode.



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1.7. Network Connector



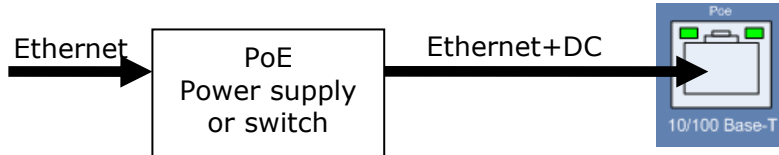
The RJ45 Network connector is supporting 10 or 100 Mbit/s link speed, and half or full duplex.

MDIX is supported for both straight and crossed twisted-pair cables.

1.7.1. PoE power supply

S16 is powered via PoE (Power Over Ethernet) following the 802.3af standard and operates as a Class I device (max 4W).

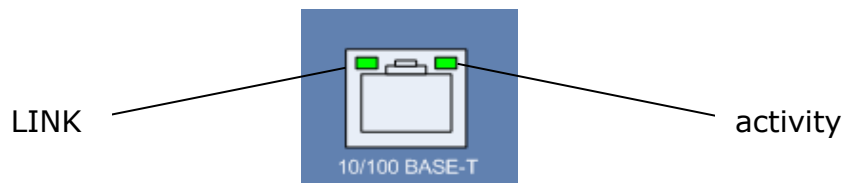
Either a dedicated PoE power supply or a PoE enabled Ethernet switch should be used.



1.7.2. LED indicators

The top left LED (green) indicates that LINK is established

The top right LED (green) when lighting indicates activity



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2. Specifications

2.1. STANDARD COMPLIANCE

IEEE 802.3 10Base-T Ethernet
 IEEE 802.3u 100Base-Tx Ethernet
 IEEE 802.3af Power over Ethernet

2.2. NETWORK CABLE

Network cable 10BASE-T: 2-pair UTP/STP Cat.3, 4, 5
 cable EIA/TIA-568 100-ohm (100m)
 100BASE-TX: 2-pair UTP/STP Cat.5 cable EIA/TIA-568 100-ohm (100m)

2.3. RF SPECIFICATIONS

Input 1-16:

Connector: F-type 75 Ohm, AC coupled

Frequency response: 4-1220 MHz
 Insertion loss: 4 MHz: 1.5 dB, 1220 MHz: 3.5 dB
 Frequency ripple: <1 dB
 Return loss: >18 dB@40 MHz -1.5 dB/oct
 Isolation: >60 dB

Output:

Connector: F-type 75 Ohm, AC coupled

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2.4. CONSOLE

Connector: RJ 45
RS232 standard
Communication parameters:
9600 baud
8 data bits
1 stop bit
No parity
No flow control

2.5. CERTIFICATION

CE
FCC

2.6. PHYSICAL SPECIFICATIONS

Height: 43.8 mm (1 unit)
Width: 482 mm (standard 19" dimensions)
Depth: 55mm (2.2")
Weight: 850 g (1.9 lb)

2.7. ELECTRICAL

Power over Ethernet according to IEEE803.2af
IEEE803.2af CLASS I device (<4W)
Reverse polarity protection
Power consumption: 1-2 Watt

2.8. ENVIRONMENTAL

Operating Temperature: 5°C ~ 45°C [41°F ~ 113°F]
Storage Temperature: -20°C ~ 55°C [41°F ~ 113°F]
Operating Humidity: 10% ~ 90%, non-condensing
Fan-less device

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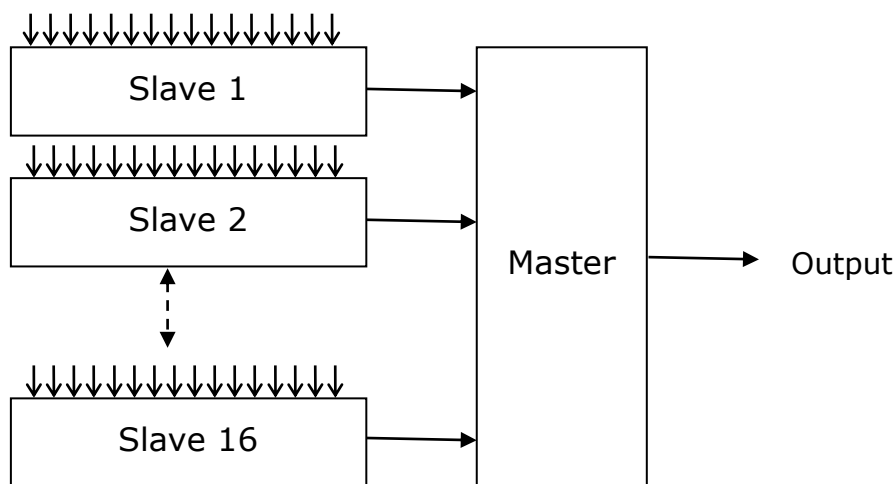
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3. MASTER/SLAVE modes

There are 2 ways to combine multiple **S16** switches together to form a larger virtual matrix switch. The modes, N:1 or 16:N are configured from the **S16** console interface.

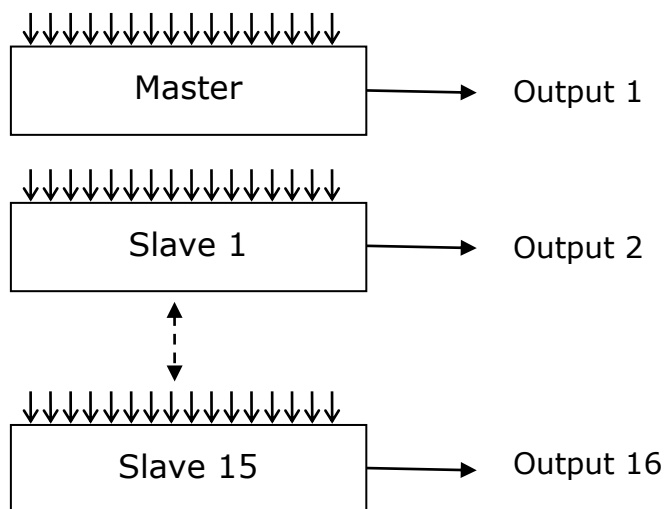
3.1. N:1 mode

The N:1 mode will form a virtual matrix of N inputs that feeds 1 output. All cross points are controlled from the MASTER **S16**. This mode can handle up to 16 SLAVE **S16** units, providing up to 256 inputs to 1 output.



3.2. 16:N mode

The 16:N mode will form a virtual matrix with N outputs, each with 16 individual inputs. Up to a total of 16 **S16** switches can be defined.



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4. User interface

4.1. RF SWITCH menu (N:1 mode)



From the **RF SWITCH** menu inputs can be assigned to the **S16** output.

4.1.1. Active Input

The Active input displays the current active input.

4.1.2. Input Selection

Dependant on the MASTER/SLAVE configuration in the **SETUP** menu 16 up to 256 input selections can be chosen from.

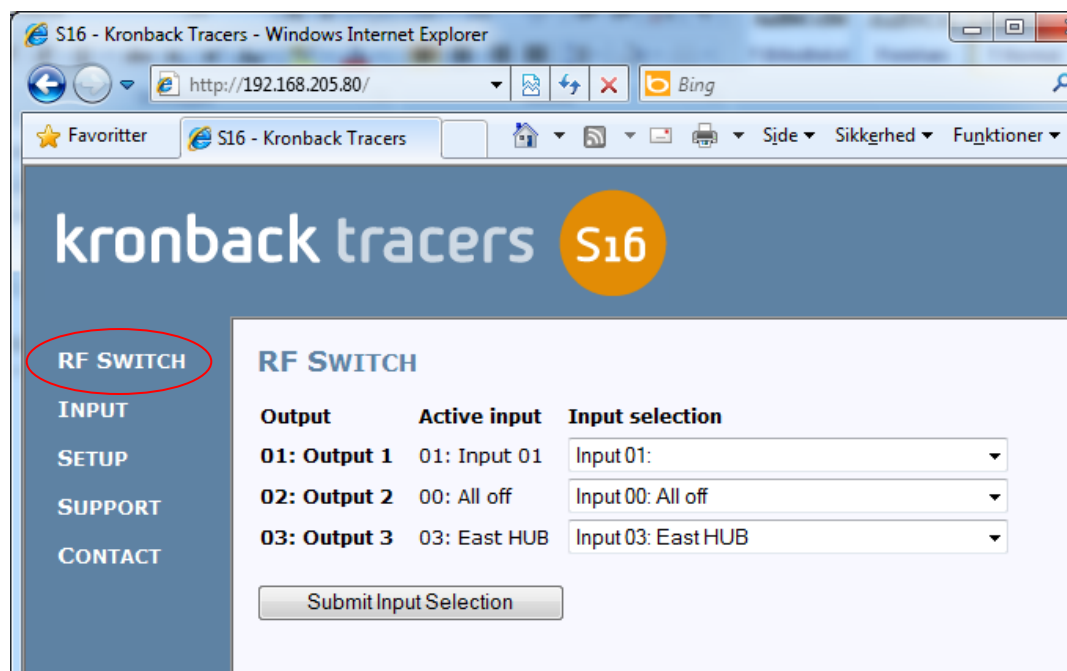
4.1.3. Submit input selection button

When the desired input has been selected, press "*Submit Input Selection*" to commit the selection.

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4.2. RF SWITCH menu (16:N mode)



From the **RF SWITCH** menu inputs can be assigned to the **S16** output.

4.2.1. Output

For each of the defined **S16** a separate line is displaying the corresponding active input.

4.2.2. Active Input

The Active input displays the current active input.

4.2.3. Input Selection

For each output 16 inputs can be selected.

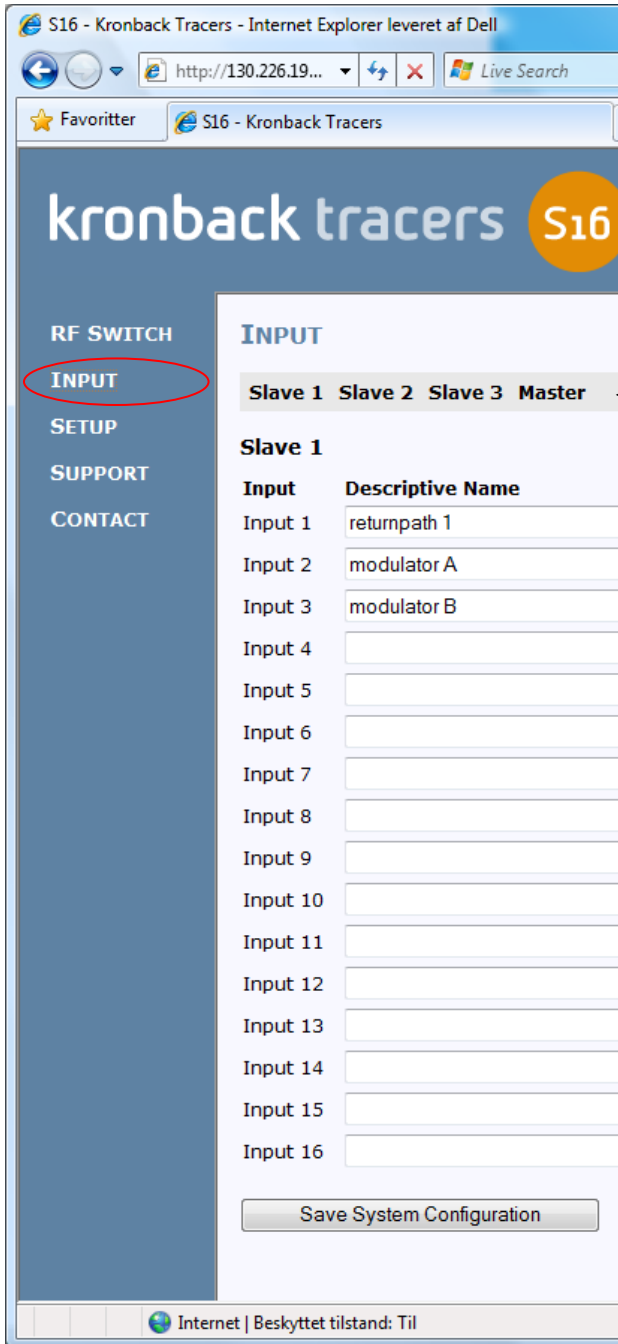
4.2.4. Submit input selection button

When the desired input has been selected, press "*Submit Input Selection*" to commit the selection.

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4.3. INPUT menu (N:1 Mode)



Dynamic Menu

The **INPUT** menu is used to enter descriptive names for each input.

The menu is dynamic, providing all **S16** that is working together in MASTER/SLAVE setup to be named from the MASTER **S16**.

The top bar displays the **S16** units that can be named.

In this example 3 SLAVES and 1 MASTER can have names assigned.

→ Note:

The MASTER input page section has only 13 inputs as three inputs are used for the cascade of the 3 SLAVES.

Descriptive name fields.

The names in the descriptive name fields can be entered up to 28 characters long, and can contain standard ASCII characters as well as domestic characters

Save system configuration button

To store the input names in the **S16** flash memory press the *Save System Configuration* button.

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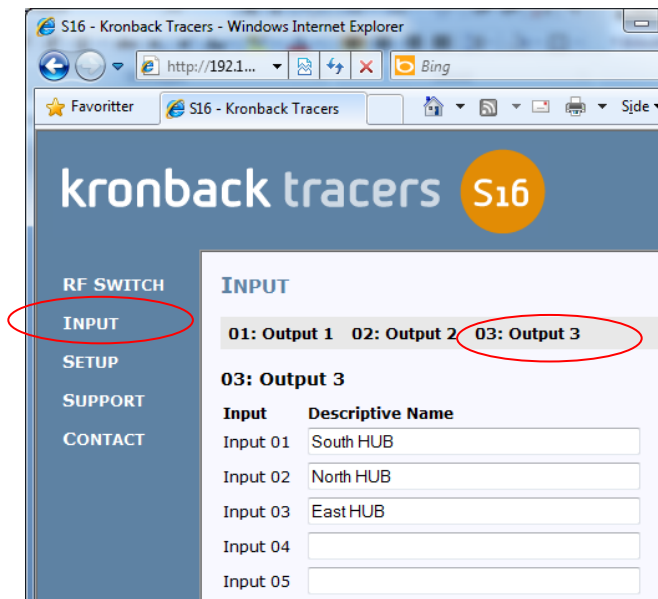
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4.4. INPUT menu (16:N Mode)

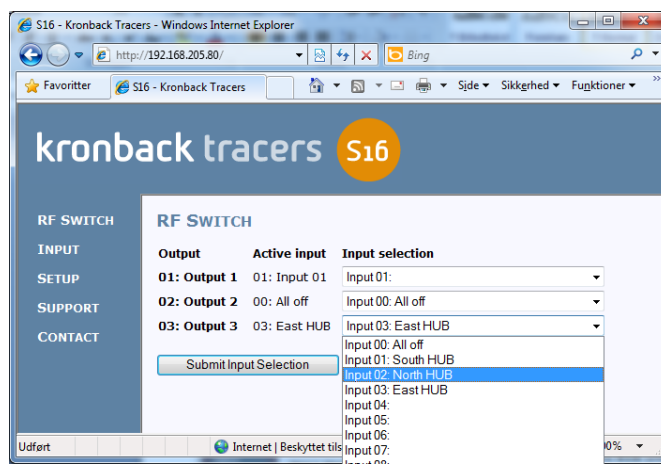
For each of the outputs defined in the **SETUP** menu, a corresponding selection can be found in the input section. Each selection has 16 inputs fields.

In this example 3 **S16** units can have name assigned.

- The 01: Output is the MASTER **S16**.
- The 02 and 03 are SLAVE **S16** units.



The above entered names will result in following **RF SWITCH** menu for the Output 3 :



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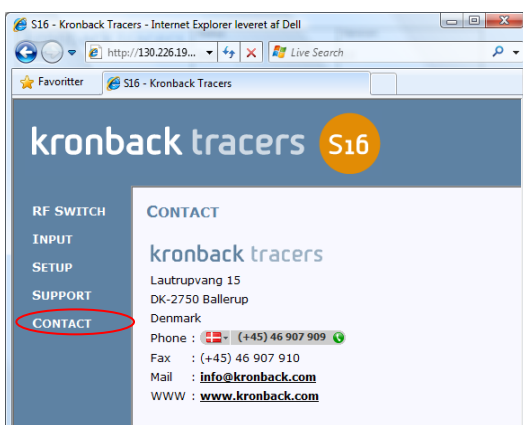
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4.5. SUPPORT menu



The **SUPPORT** menu contains technical information, hardware and firmware versions and IP parameter information.

4.6. CONTACT menu

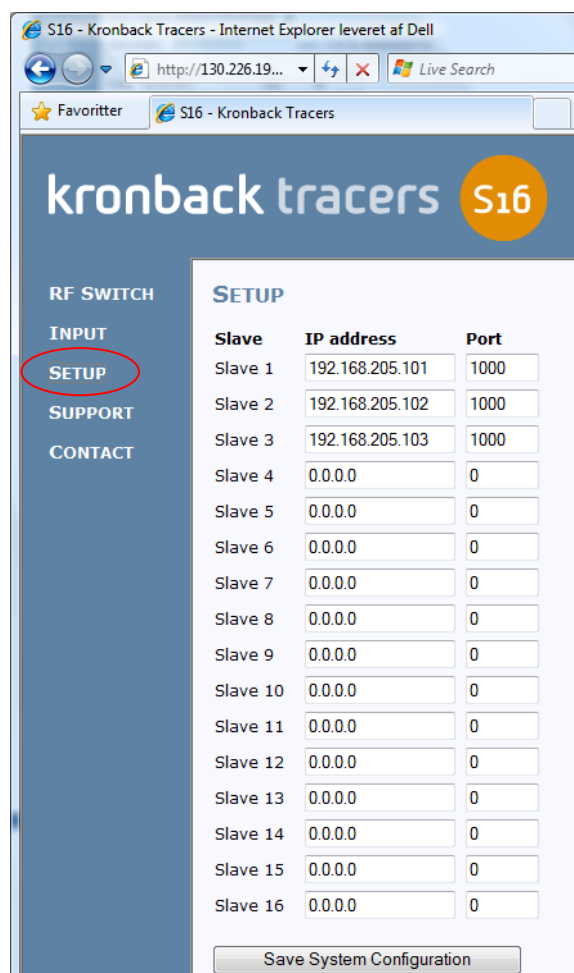


Contact details for Kronback Tracers support can be found in the **CONTACT** menu.

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4.7. SETUP menu (N:1 mode)



The **SETUP** menu is used to define the topology when multiple external switches are connected as SLAVES to the MASTER **S16** for input expansion.

4.7.1. IP address

IP address of the connected switches. These must be formatted as IP-addresses (e.g. 192.168.205.101) DNS names are not allowed.

4.7.2. Port

The port number used for the IP socket connection to the external switches. These are factory preset to 1000 in the **S16** switches, but can be changed from the console interface of the **S16**.

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4.7.3. Switch topology

Up to 16 external switches can be defined, providing a 256 input **S16** MASTER/SLAVE system.

The number of inputs that is set via the **SETUP** menu is globally changing all pages and menus in the **S16** related to inputs.

4.7.4. Input steps

Each additional input switch provides 16 extra inputs, but occupies 1 input for the cascade connection to MASTER **S16**, consequently the input increments are in steps of 15.

Number of SLAVE switches	Number of inputs
MASTER alone	16
1	31
2	46
3	61
4	76
5	91
6	106
7	121
8	136
9	151
10	166
11	181
12	196
13	211
14	226
15	241
16	256

External switches must be connected to the MASTER **S16** from input 16 and down. The inputs of the **S16** that are not used for the cascading are always the last inputs of the system.

Please see the "Topology example 61 inputs" chapter.

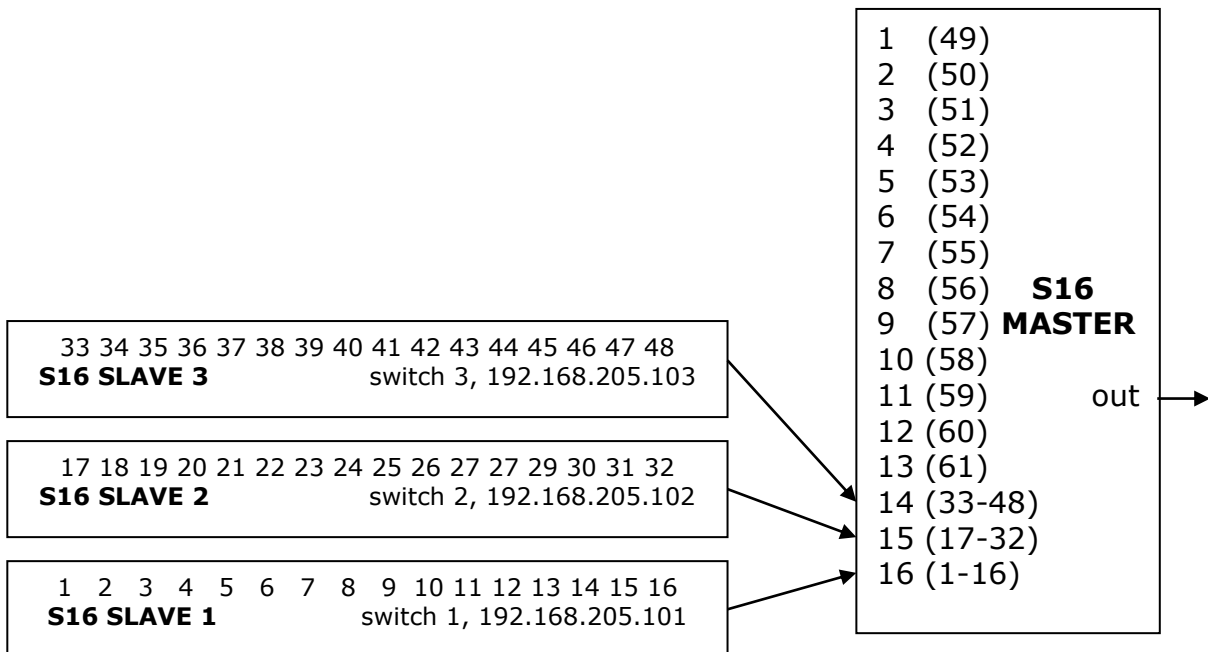
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4.7.5. Topology example 61 inputs

A 61 input system is built of 1 **MASTER S16** and 3 **SLAVE S16**.

- **SLAVE 1** is connected to the **MASTER's** input 16. (input 1 to 16)
- **SLAVE 2** is connected to the **MASTER's** input 15. (input 17 to 32)
- **SLAVE 3** is connected to the **MASTER's** input 14. (input 33 to 48)
- This leaves input 1 to 13 of the **MASTER** free (input 49 to 61)



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4.7.6. State check

The state of each SLAVE and the MASTER setting can be verified by viewing the LED´s over each f-connector.

To verify correct configuration, simply run through all inputs from the **SWITCH** menu. Check that the correct LED´s on the SLAVE and MASTER fronts are lighting.

For further assurance, a signal generator could be connected to each input for verification of correct signal paths and levels.

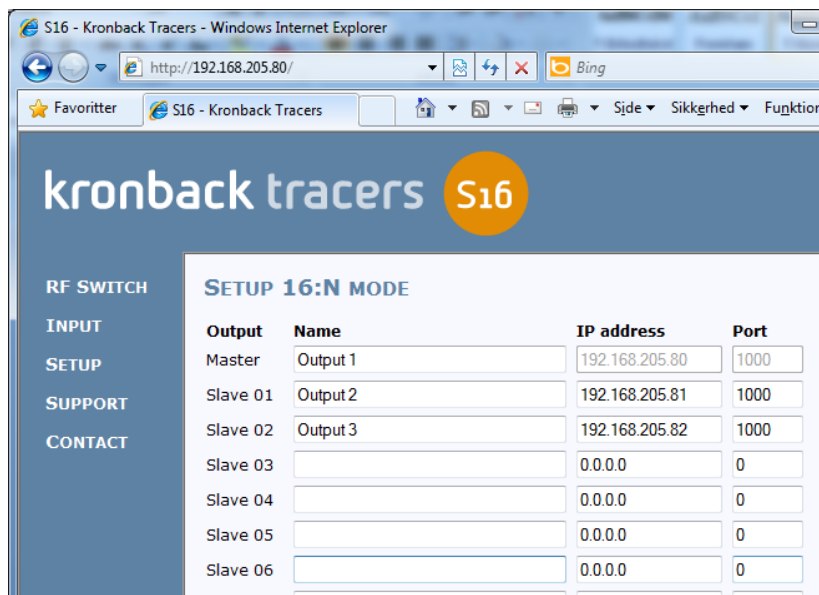
4.7.7. LED´s on unused inputs

Note that the MASTER does not switch the LED´s on inactive SLAVE switches off. The reason for this is to avoid unnecessary IP traffic on switch-off commands and to ensure optimal switching speed. However the combination of the MASTER LED and the LED of the associated SLAVE switch will still be correct.

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4.8. SETUP menu (16:N mode)



The **SETUP** menu is used to define the topology when multiple external switches are connected as SLAVES to the MASTER **S16**.

4.8.1. Output

Each **S16** can be named with a descriptive output name to ease navigation in the **RF SWITCH** menu.

4.8.2. IP address

IP address of the connected switches. These must be formatted as IP-addresses (e.g. 192.168.205.101) DNS names are not allowed.

4.8.3. Port

The port number used for the IP socket connection to the external switches. These are factory preset to 1000 in the **S16** switches, but can be changed from the console interface of the **S16**.

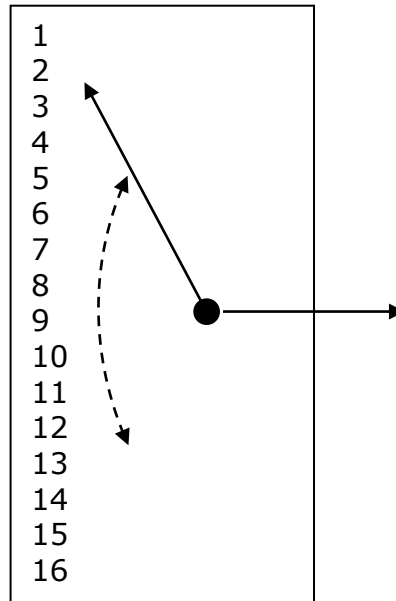
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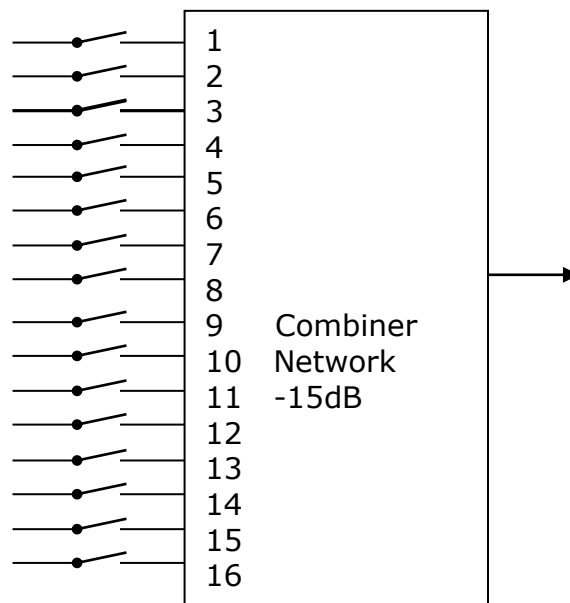
5. SP16T and Combiner mode

The **S16** has 2 main operation modes. It can run as a SP16T switch with 16 inputs where only one input is assigned to the **S16** output. The Web based GUI supports only the SP16T mode. The socket command interface supports control of both modes.

5.1. SP16T mode



5.2. Combiner mode



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6. Methods for adding slave units (N:1 mode)

Method 1 <i>Add new master under old master</i>	Method 2 <i>Move Master down</i>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">A (1-16) MASTER IP:1.2.3.4</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">A (1-16)</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">B (17-31) MASTER IP 1.2.3.4</div> <div style="text-align: right;"><i>new</i></div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">A (1-16)</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">B (17-32)</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">C (33-46) MASTER IP 1.2.3.4</div> <div style="text-align: right;"><i>new</i></div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">A (1-16)</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">B (17-32)</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">C (33-48)</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">D (49-61) MASTER IP 1.2.3.4</div> <div style="text-align: right;"><i>new</i></div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">A (1-16) MASTER IP:1.2.3.4</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">B (1-16)</div> <div style="text-align: right;"><i>new</i></div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">A (17-31) MASTER IP:1.2.3.4</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">B (1-16)</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">C (17-32)</div> <div style="text-align: right;"><i>new</i></div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">A (33-46) MASTER IP:1.2.3.4</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">B (1-16)</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">C (17-32)</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">D (33-48)</div> <div style="text-align: right;"><i>new</i></div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">A (49-61) MASTER IP:1.2.3.4</div>
<p>Pro: No re- cabling</p> <p>Con: Retype of input names and setup New master must have old masters IP</p>	<p>Pro: No change in IP and Input names / setup</p> <p>Con: Physical work:</p> <ul style="list-style-type: none"> • Disconnect 16 cables • move master down • insert new S16 over master • re-connect 16 cables

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7. Network Setup

7.1.1. Factory network settings

The **S16** is shipped with following factory settings:

Setting	Value
IP Address	192.168.205.80
Subnet Mask	255.255.255.0
Gateway	192.168.205.1
TCP Socket port	1000

7.1.2. DHCP

The **S16** does not support DHCP, only fixed IP is possible.

7.1.3. Link speed

The **S16** supports auto negotiation and accepts the following link speeds and configurations:

7.1.4.

Value
10 Mbit Half Duplex
10 Mbit Full Duplex
100 Mbit Half Duplex
100 Mbit Full Duplex

Forced link speed is not supported.

7.1.5. Network configuration.

The Network parameters are configured via the Console interface.

See the chapter **Console interface** for more information on setting network parameters.

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8. Console interface

The console interface is activated during power-up of **S16**.
During **S16** operation the console interface provides status and debug information

```

*****
*          S16 SWITCH          *
*          MASTER MODE N:1     *
*****
S16 compiled Apr 19 2010 11:46:24

Press any key to enter setup
In 5
In 4
In 3

```

The **S16** is configured from the front panel using the RS232 connector marked **CONSOLE**.

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8.1.1. RS232 parameters

RS232 parameter	Value
Baud rate	9600 bps
Data bits	8
Parity	None
Stop bit	1
Flow control	None

8.1.2. Console Cable

The Console interface is accessed using a Kronback tracers blue console cable marked "Kronback Tracers x16 console cable"

The pinout of kronback tracers x16 console cable is:

S16 RJ45 pin	direction	PC RS232 dsub9 female	Function
3	→	2	S16 data TX
4		5	ground
5		5	ground
6	←	3	S16 data RX
7		5	ground
8		5	ground

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8.1.3. Using the console interface

Few seconds after **S16** has been powered, the Console interface responds with the following message:

```

*****
*          S16 SWITCH          *
*          MASTER MODE N:1     *
*****
S16 compiled Apr 19 2010 11:46:24

Press any key to enter setup
In 5
In 4
In 3

```

Press a key during the countdown from 5 to 1. The console interface enters the configuration menu:

8.1.4. Configuration menu

```

*****
*          LAN SWITCH          *
*****
* 1) Set IP address           *
* 2) Set Port                 *
* 3) Set Master Mode          *
* 4) Factory Reset           *
* 5) Exit                     *
*****
* Please select an option     *

```

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8.1.5. Command 1, Set IP address

The **S16** is shipped with the following factory settings:

Setting	Value
IP Address	192.168.205.80
Subnet Mask	255.255.255.0
Gateway	192.168.205.1

To change the IP address press 1 in the configuration menu. The current IP settings are displayed:

```
*****
* Please select an option *
*****
* IP setting *
*****
* IP: 192.168.205.080 *
* SUBNET: 255.255.255.000 *
* GATEWAY: 192.168.205.001 *
*****
* Do You wish to change[Y/N] *
```

Press Y to change the settings for IP address, Subnet mask and Gateway:

```
*****
* IP: 192.168.205.081 *
* SUBNET: 255.255.255.000 *
* GATEWAY: 192.168.205.001 *
*****
* Do You wish to change[Y/N] *
* Enter IP xxx.xxx.xxx.xxx: *
192.168.205.81
* Enter SUBNET xxx.xxx.xxx.xxx: *
255.255.255.0
* Enter GATEWAY xxx.xxx.xxx.xxx: *
192.168.205.1_
```


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8.1.6. Command 2, Set TCP port

The **S16** is shipped with following factory settings

Setting	Value
TCP port	1000

To change the TCP Port of the Socket remote control interface press 2 in the configuration menu. The current TCP Port is displayed:

```
*****
*          PORT setting          *
*****
* PORT:      01000              *
*****
* Do you wish to change [Y/N]  *
```

Press Y to change the settings for IP TCP Port:

```
*****
*          PORT setting          *
*****
* PORT:      01000              *
*****
* Do you wish to change [Y/N]  *
* Enter Port 0-65536            *
1001_
```

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8.1.7. Command 3, Master Mode

To change the Master Mode press 3 in the configuration menu. The current mode is displayed:

```

*****
* Please select an option *
*****
*      Master Mode Select      *
*****
*      16:N Mode               *
*****
* Do you wish to change [Y/N] *

```

Press Y to change the settings for Master Mode:

```

*****
* Please select an option *
*****
*      Master Mode Select      *
*****
*      16:N Mode               *
*****
* Do you wish to change [Y/N] *
* G: 16:N mode                 *
* W: N:1 mode                  *

```

Select one of the choices:

Selection	Mode
G	16:N
W	N:1

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8.1.8.Command 4, Factory Reset

The factory reset brings the **S16** back to the shipped configuration:

- Clears all Descriptive text in the **INPUT** menu
- Clears all MASTER/SLAVE information in the **SETUP** menu
- Defaults the TCP Port to

Setting	Value
TCP port	1000

- Defaults the IP configuration to

Setting	Value
IP Address	192.168.205.80
Subnet Mask	255.255.255.0
Gateway	192.168.205.1

To perform a Factory Reset, press 3 in the configuration menu. This message is displayed:

```

*****
*          Factory Reset          *
*****
* This will erase all             *
* configuration to                *
* factory settings                *
* Do You wish to reset[Y/N]      *

```

Press Y to commit the Factory Reset

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8.1.9. Command 5, Exit

To exit the console configuration interface and start the **S16**, pres 5 in the configuration menu.

The console interface exits with this message:

```
Continue
MAC address.....: 00-1F-59-16-12-13
IP address.....: 192.168.205.80
Subnet mask.....: 255.255.255.0
Default gateway: 192.168.205.1
```

the **S16** is now operational.

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9. Socket command protocol

The socket command protocol is a binary protocol used for remote control of the **S16**.

The protocol can be used to remote control the **S16** from a remote command computer over Ethernet. The remote computer must initiate the socket connection.

In MASTER/SLAVE mode the **S16** MASTER is using the socket protocol to control the **S16** SLAVES.

In case of no activity in 30 seconds **S16** is disconnecting, and a new socket connection has to be established from the remote computer.

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9.1. SET OUT

The SET OUT 1 command assigns any input of the **S16**, including ALL-OFF to the Output.

This command is compatible with the Kronback Tracers 16·4, 16x4 RF matrix switch "SET OUT1".

Format:

command	Data [BYTE]	suffix
0x01	0x00 : ALL-OFF 0x01: input 1 ... 0x10: input 16	0xFF

Reply:

command	Data [BYTE]	suffix
0x02	0x00 : ALL-OFF 0x01: input 1 ... 0x10: input 16	0xFF

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9.2. GET OUT

The GET OUT reads current input assigning status of the **S16** Output, including ALL-OFF
This command is compatible with the Kronback Tracers 16·4, 16x4 RF matrix switch
"GET OUT1".

Format:

command	suffix
0x02	0xFF

Reply:

command	Data [BYTE]	suffix
0x02	0x00 : ALL-OFF 0x01: input 1 ... 0x10: input 16	0xFF

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9.3. SET Combiner mode

The following command is used to activate the **S16** combiner mode:

command	Data [BYTE1]	Data [BYTE2]	suffix
0x01 0x11	Binary representation of input 9 to 16	Binary representation of input 1 to 8	0xFF

Reply:

command	Data [BYTE]	suffix
0x02	0x00	0xFF

The combiner command is accumulative. New cross points adds to existing. To rewrite a clear command must be sent:

command	Data [BYTE]	suffix
0x01	0x00 : ALL-OFF	0xFF