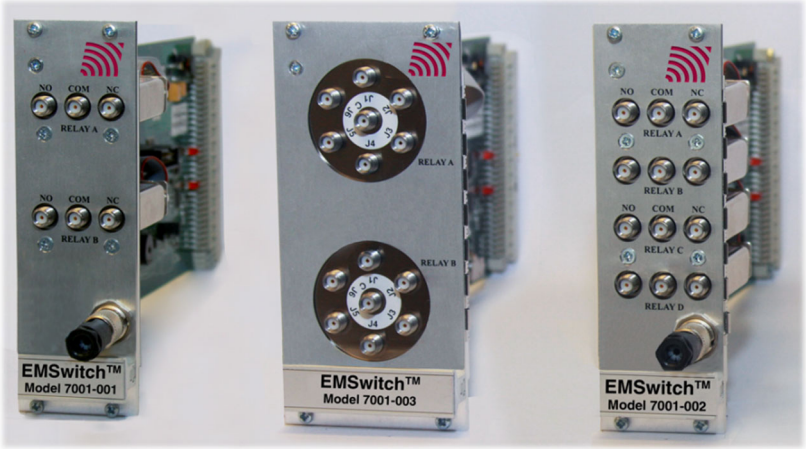
EMSwitch™

RF Switch Plug-In Card

User Manual



Model 7001-001 *Model 7001-003* *Model 7001-002*

(not all models shown)

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Revision Record

MANUAL, EMSWITCH | Part #399343, Rev. G

Revision	Description	Date
A	Initial Release	June, 2014
B	Updated EMCenter models	June, 2014
C	Added Model 7001-005; updated *EMSwitch Remote Relay*	July, 2015
D	Updated Typical Data with main specifications	March, 2016
E	Updated physical specifications	December, 2016
F	Corrected specs on page 39-40; added replacement part information	May, 2020
G	Removed incorrect warranty info	September, 2020

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Notes, Cautions, and Warnings

Note: Denotes helpful information intended to provide tips for better use of the product.

Caution: Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.

Warning: Denotes a hazard. Failure to follow instructions could result in SEVERE personal injury and/or property damage. Included text gives proper procedures.

Safety Information

OR

High Voltage: Indicates presence of hazardous voltage. Unsafe practice could result in severe personal injury or death.

Protective Earth Ground (Safety Ground): Indicates protective earth terminal. You should provide uninterruptible safety earth ground from the main power source to the product input wiring terminals, power cord, or supplied power cord set.

Laser Warning: Denotes a laser (class 1M) is part of the operating system of the device.

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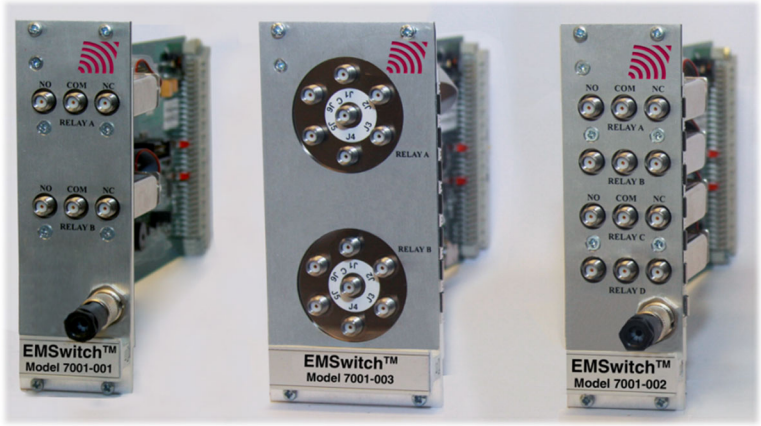
1.0 Introduction

The **ETS-Lindgren EMSwitch™ RF Switch Plug-in Card** is a general purpose multi-channel switch matrix used to switch the RF path of equipment for RF measurement applications, including immunity, emissions, and wireless measurements. EMSwitch is designed for use with the EMCenter™ Modular RF Platform; for more information about EMCenter, see page 9.



The first relay of each EMSwitch card can be used as a standard relay or as a safety interlock relay. When being used as a safety interlock relay, the RF input signal to the RF amplifier can be switched off to prevent personnel from being subjected to high RF fields. The RF interlock input can, for example, be connected to a switch mounted on the entrance door of the test chamber.

EMSwitch is fully supported by ETS-Lindgren TILE!™ (Totally Integrated Laboratory Environment), ETS-Lindgren EMQuest™ Data Acquisition and Analysis Software, and other test automation software packages. Contact ETS-Lindgren for additional information.

EMSwitch Models

EMSwitch cards switch RF signals up to 40 GHz, depending on the model, with powers up to 240 W (3 GHz) directly or any RF power switches indirectly. When high power RF amplifiers are used in a test system, the EMSwitch card can be connected to an optional EMSwitch Remote Relay Module. For more information, see page 10.

The following models of the EMSwitch card are available:

Note: The EMCenter supports any installed combination of EMSwitch cards.

18 GHz Models

- **7001-001—**Two SPDT coaxial relays
- **7001-002—**Four SPDT coaxial relays
- **7001-003—**Two SP6T coaxial relays
- **7001-005—**One SP6T coaxial relay

40 GHz Models

- **7001-011—**Two SPDT coaxial relays
- **7001-012—**Four SPDT coaxial relays
- **7001-013—**Two SP6T coaxial relays
- **7001-015—**One SP6T coaxial relay

12.4 GHz Model

- **7001-021—**One SPDT coaxial relay

EMCenter Modular RF Platform (Required)

The EMCenter Modular RF Platform is required for operation, and is sold separately.

Front Panel

Back Panel

The EMCenter may be controlled from a computer using these software products:

- ETS-Lindgren TILE!™ (Totally Integrated Laboratory Environment)
- ETS-Lindgren EMQuest™ Data Acquisition and Analysis Software
- Other test automation software

Contact ETS-Lindgren for ordering information.

EMSwitch Remote Relay (Optional)

The Model 7001-004 Remote Relay is an optional 19-inch 2U rack-mountable device to control up to four external (coax) relays using the touchscreen on the EMCenter or with one of these software products:

- ETS-Lindgren TILE!™ (Totally Integrated Laboratory Environment)
- ETS-Lindgren EMQuest™ Data Acquisition and Analysis Software
- Other test automation software

It has an internal power supply to power 12 VDC/28 VDC relays. For more information on the Remote Relay, see page 21.

Standard Configuration

- EMSwitch™ RF Switch Plug-in Card
- Interlock

Note: A 7000-xxx series EMCenter Modular RF Platform is required for operation, and is sold separately. Contact ETS-Lindgren for ordering information.

Replacement Parts

Replacement Part Description	Part Number
EMSwitch Interlock Plug (Binder 3-Way)	1608925

Optional Items

- Model 7001-004 Remote Relay

2.0 Maintenance

CAUTION: Before performing any maintenance, follow the information provided in *Safety Information* on page v.

WARNING: Maintenance of the EMSwitch card is limited to external components such as cables or connectors.

If you have any questions concerning maintenance, contact ETS-Lindgren Customer Service.

Maintenance of Fiber Optics (If Used)

Fiber optic connectors and cables can be damaged from airborne particles, humidity and moisture, oils from the human body, and debris from the connectors they plug into. Always handle connectors and cables with care, using the following guidelines.

CAUTION: Before performing any maintenance, disconnect the fiber optic cables from the unit and turn off power.

When disconnecting fiber optic cables, apply the included dust caps to the ends to maintain their integrity.

Before connecting fiber optic cables, clean the connector tips and in-line connectors.

Before attaching in-line connectors, clean them with moisture-free compressed air.

Failure to perform these tasks may result in damage to the fiber optic connectors or cables.

CONTACTING ETS-LINDGREN

Note: Please see www.ets-lindgren.com for a list of ETS-Lindgren offices, including phone and email contact information.

SENDING A COMPONENT FOR SERVICE

1. Contact ETS-Lindgren Customer Service to obtain a Service Request Order (SRO).
2. Briefly describe the problem in writing. Give details regarding the observed symptom(s) or error codes, and whether the problem is constant or intermittent in nature. Please include the date(s), the service representative you spoke with, and the nature of the conversation. Include the serial number of the item being returned.
3. Package the system or component carefully. If possible, use the original packing materials or carrying case to return a system or system component to ETS-Lindgren.

3.0 Specifications

Note: The first switch on each EMSwitch card can be used as a true interlock switch.

Performance Specifications

	Number of Relays	Frequency Band	RF Switching Capacity
7001-001	2x SPDT	18 GHz	DC to 3 GHz: 240 W 3 to 8 GHz: 150 W 8 to 12.4 GHz: 120 W 12.4 to 18 GHz: 100 W
7001-002	4x SPDT		
7001-003	2x SP6T		
7001-005	1xSP6T		
7001-011:	2x SPDT	40 GHz	DC to 6 GHz: 80 W 6 to 12.4 GHz: 60 W 12.4 to 18 GHz: 50 W 18 to 26.5 GHz: 20 W 26.5 to 40 GHz: 10 W
7001-012:	4x SPDT		
7001-013:	2x SP6T		DC to 6 GHz: 40 W 6 to 12.4 GHz: 30 W 12.4 to 18 GHz: 25 W 18 to 26.5 GHz: 15 W 26.5 to 40 GHz: 5 W
7001-015:	1xSP6T		
7001-021:	1x SPDT	12.4 GHz	DC to 1 GHz: 700 W 1 to 2 GHz: 500 W 2 to 3 GHz: 400 W 3 to 8 GHz: 250 W 8 to 12.4 GHz: 200 W

Lifetime Relays

- SPDT relays, SMA or 2.92mm (k): 10,000,000 cycles
- SP6T relay SMA: 5,000,000 cycles
- SP6T relay 2.92mm (k): 2,000,000 cycles
- N type relay: 1,000,000 cycles

Electrical Specifications

All EMSwitch™ RF Switch Plug-in Cards perform to the following electrical specifications:

- **Supply Voltage (Volts):** Through EMCenter

Note: The supply voltage for the Model 7001-004 Remote Relay is 230 VAC.

- **Power Consumption (Max Watts):** 30 W

Physical Specifications

	Exterior Dimension	RF Connectors	Remote Control External Relays
7001-001	One slot	SMA type	Fiber optic link
7001-002			
7001-003	Two slots		
7001-005	Two slots	SMA type	
7001-011	One slot	k type 2.92 mm	
7001-012			
7001-013	Two slots		
7001-015			
7001-021	One slot	N type	
7001-004 (H x W x D)	2U x 250 mm x 482.6 mm 2U x 9.8 in x 19 in	SMA type	

Environmental Specifications

All EMSwitch cards perform to the following environmental specifications:

- **Temperature Range:** 0°C to 40°C (32°F to 104°F)
- **Relative Humidity:** 10% to 90% (non-condensing)

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4.0 EMSwitch Card Controls and Connectors

CAUTION: Before placing into operation, follow the information provided in *Safety Information* on page v.

Relay Number and Contact Definitions

7001-001, 7001-002, 7001-011, 7001-012	
Relay number	Indicated below each relay, A to D.
Common	The center SMA connector of each relay, labeled **COM**.
Normally Open	The left SMA connector of each relay, labeled **NO**.
Normally Closed	The right SMA connector of each relay, labeled **NC**.
7001-003, 7001-005, 7001-013, 7001-015	
Common	The center connector; the six contacts are labeled J1 to J6.
7001-021	
Common	The center N connector, labeled **COM**.
Normally Open	The bottom N connector, labeled **NO**.
Normally Closed	The top N connector, labeled **NC**.

Interlock

The interlock connector provides two floating contacts which require shorting for the first relay.

If the interlock is open, the first relay will illuminate red on the EMCenter™ Modular RF Platform screen and the relay cannot be used. Use the supplied connector to wire to the emergency switch of your site. Connect the two pins of the connector.

Note: For replacement interlock connectors, contact ETS-Lindgren to order part number 1608925.

5.0 EMSwitch Plug-In Card Installation

CAUTION: Before connecting any components, follow the information provided in *Safety Information* on page v.

CAUTION: The EMSwitch card is designed to be used ONLY with the EMCenter. Do not use the card in combination with any other system.

Plug-In Card Installation

Note: Due to the width of the 7001-003, 7001-005, 7001-013, and 7001-015 EMSwitch cards, two consecutive empty slots are required for installation.

1. Determine in which empty slot in the EMCenter™ Modular RF Platform you want to install the EMSwitch™ RF Switch Plug-in Card. Looking at the back of the EMCenter, the slots are numbered 1 through 7 from left to right.
2. Remove the blank panel from the slot by removing the two screws at the top of the blank panel and the two screws at the bottom. Remove two consecutive blank panels if you are installing the 7001-003, 7001-005, 7001-013, or 7001-015 EMSwitch card.
3. Carefully insert the EMSwitch card into the slot(s) of the EMCenter. Tighten the four screws.
4. Turn on the EMCenter. The EMCenter will automatically detect the newly-installed EMSwitch card.
5. Depending on the test setup requirements, connect coaxial cables to the relay connections on the back panel of the EMCenter.
6. Connect the EMCenter to a personal computer using USB, RS-232, Ethernet, or IEEE (optional).
7. Plug the interlock into the connector on the back of the EMCenter.

The card installation is complete. You can control EMSwitch through the EMCenter touchscreen, with ETS-Lindgren TILE!™ (Totally Integrated Laboratory Environment), ETS-Lindgren EMQuest™ Data Acquisition and Analysis Software, and other test automation software packages. Contact ETS-Lindgren for additional information.

6.0 EMSwitch Remote Relay

CAUTION: Before placing into operation, follow the information provided in *Safety Information* on page v.

For applications that require to switch higher power signals (>700 Watts), it is not possible to use internal relays of the switch cards; in those cases, special dedicated relays are needed in the test setup. For these external relays, EMSwitch™ Model 7001-004 Remote Relay, which is capable of driving two external relays, is available.

Model 7001-004 can drive any relay with a supply voltage of 12V, 24V, or 28V, and from SPDT to SP6T. For each relay a driver current of 0.5A is available, or 1A if only one relay is connected.

The type of relay and the usage of indicator contacts can be configured in software. The connection for relay 1 and relay 2 are identical.

Front and Back Panel Connectors

The front panel includes a key switch and an LED. If the EMSwitch™ Remote Relay is connected to a 220 V AC power supply and the on/off switch on the back panel is set to the **I** position, you can power on the remote relay by turning the key clockwise. The LED will illuminate.

The Remote Relay must be connected to a 220 V AC power supply via the mains lead, connected at the AC inlet on the back panel.

Relays

You can connect four relays to the remote relay. It is possible to connect relays with 1 input and 2, 3, 4, 5, or 6 outputs.

To connect external relays you must use the mating connector set included with the remote relay.

The **relay x drive** connectors on the back panel of the remote relay will switch the relays into position.

- For a 24 V relay, connect pin 1 (24 V DC output) to the Common of the relay power terminals.
- For a 12 V relay, connect pin 2 (12 V DC output) to the Common of the relay power terminals.
- Connect pin 3–8 to the power terminals 1–6 of the relay.

The number of power terminals to connect depends on the type of relay you use. For example, a 1–6 relay requires all of the pins, and a 1–3 relay requires three pins.

Readback Function

The **relay x readback** connectors on the back panel remote relay can verify if the external relay is set into position.

1. Connect pin 1 (3v3 out) to the indicator common of the relay.
2. Connect pin 2 to the first indicator of the relay.
3. Connect pin 3 to the second indicator; continue until complete.

The number of indicator terminals to connect depends on the type of relay you use. Pin 8 is not in use.

Set the readback function on or off in the EMCenter™ Modular RF Platform depending on the number of relay(s) with readback function that you use.

Set Up RS-232 Address

You can connect up to four external switch boxes to one EMCenter. Interconnect the switch boxes with straight RS-232 cables. The DIP switches on the back panel of the EMCenter allow you to set the individual addresses.

DIP Switch				EMSwitch Remote Relay Address
1	2	3	4	
On	On	On	—	Address 1
Off	On	On	—	Address 2
On	Off	On	—	Address 3
Off	Off	On	—	Address 4

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7.0 Operation

CAUTION: Before placing into operation, follow the information provided in *Safety Information* on page v.

CAUTION: Prior to operation, verify that the mains voltage is within the operating range of the equipment.

Powering On and Off EMCenter

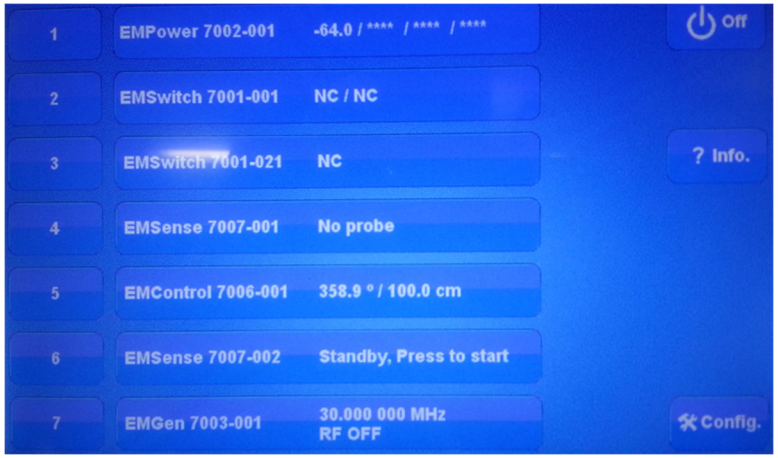
Note: For information on using the EMCenter touchscreen, see the *EMCenter Modular RF Platform User Manual*.

POWER ON

Note: Verify all cards are installed correctly in the EMCenter.

1. Verify that the EMSwitch™ RF Switch Plug-in Card safety relay interlock connection is closed. For more information, see page 29.
2. Plug the power cord from the mains inlet on the back panel of the EMCenter into a power outlet.
3. Plug the interlock jack into the interlock connector on the back panel of the EMCenter.
4. Turn the power switch located on the back panel of the EMCenter to the on position.

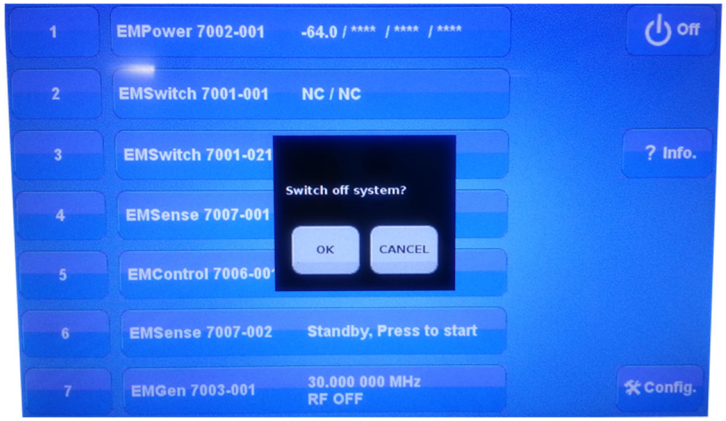
5. Touch anywhere on the EMCenter screen. It will take approximately 20 seconds to boot. The Information screen will flash, and then the Home screen will display.



Sample EMCenter Home Screen

POWER OFF

1. Press the **Off** button located on the EMCenter screen.



2. Press **OK** to switch off the system.

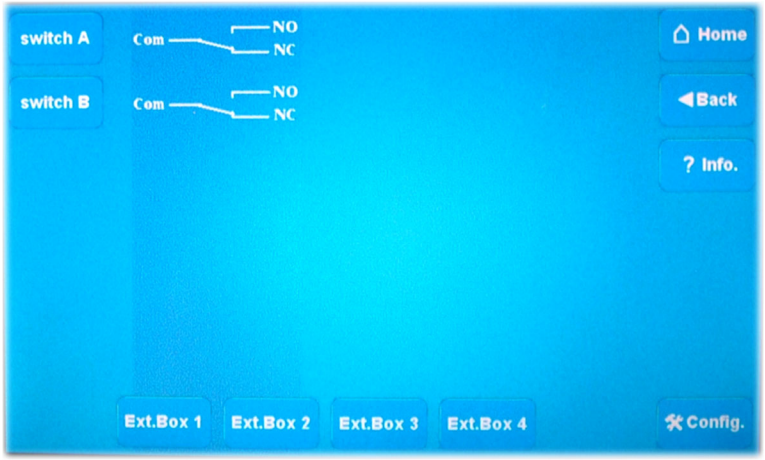
   The standby light located on the front panel of the EMCenter will flash, and then will illuminate steadily.

Note: When the EMCenter is in standby mode, touch the screen anywhere to reboot.

3. Turn the power switch located on the back panel of the EMCenter to the off position.
4. Remove the power cord from the power connector on the back panel of the EMCenter.
5. Remove the interlock jack from the interlock connector on the back panel of the EMCenter.

Manual Control of EMSwitch

To change relay position settings, on the Home screen press the status box to the right of the slot number for the installed EMSwitch plug-in card. This will display the following switch screen:



Sample Switch Screen
*(**Com**—Common **NO**—Normally Open **NC**—Normally Closed)*

Press a switch button (**switch A**, **switch B**, and so on) to toggle between **NO** and **NC**.

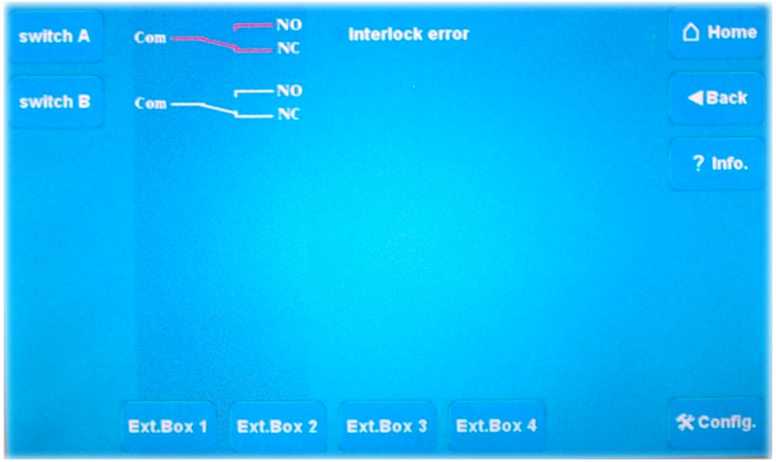
Safety Interlock Relay

Relay A on each EMSwitch plug-in card can be used as a safety interlock relay. As long as the connector is shorted (by an external interlock switch), the relay can be activated. However, as soon as the interlock circuit opens, relay A will return to the idle position.

Note: If you do not want to use this relay as a safety relay, the connector must be shorted in order to use it as a standard relay.

When the safety interlock relay is activated, the power supply to the first relay of the card will be interrupted (fully hardware controlled), causing the relay to switch to the normally open position. The EMCenter will detect this interlock status and display a message. For safety reasons, the software is not able to overrule this interlock condition.

After the interlock has been closed again, the relay will switch automatically to its original condition.



Sample Interlock Error Screen

The interlock hardware is implemented in a redundant way for maximum safety. The interlock relay can be used to interrupt the signal path between the signal generator and the power amplifier. An interlock switch mounted on the door of the test chamber can be used to activate the safety relay, preventing personnel from being subject to high field strengths when entering the test chamber.

Relay Errors

The EMSwitch plug-in card checks for the following error conditions of the internal relays:

1. **Over temperature—**A temperature sensor close to each relay checks for excessive heating of the relay. A **high temperature** error will display if the relay temperature exceeds 85°C (185°F).
2. **Switching error—**Each internal relay has a set of control contacts which are used to check if a relay has changed position. A **switching error** message will appear if this check fails.
3. **Interlock open for safety interlock relay—**When the interlock of relay A is opened, this will result in a **safety interlock open** error.

8.0 EMSwitch Command Set

See *Remote Commands* on page 33 for the commands that can be used with the EMSwitch™ RF Switch Plug-in Card. Each command must include a device ID number as the prefix; see the *EMCenter Modular RF Platform User Manual* for complete information on device ID numbers.

- Terminate each command with a line feed (LF, shown as **\n** in command syntax).
- Each response from the device is terminated with a line feed (LF, shown as **\n** in command syntax).

Examples

EXAMPLE 1: REQUEST SOFTWARE VERSION

To request the software version of the EMSwitch card with device ID number 1:

```
S1:VERSION_SW?
```

EXAMPLE 2: SET INTERNAL RELAY

To set the internal relay A from the EMSwitch card with device ID number 1 to normally open:

```
S1:INT_RELAY_A_NO
```

EXAMPLE 3: SET EXTERNAL RELAY

To set the external relay 3 from the EMSwitch Remote Relay with address 4, connected to the EMSwitch card at slot 2, position 5:

```
S2:N14RELAY_3_5
```

S = Device character of EMSwitch card

2 = Board number of EMSwitch card

N1 = Indicates EMSwitch card to pass message to external interface

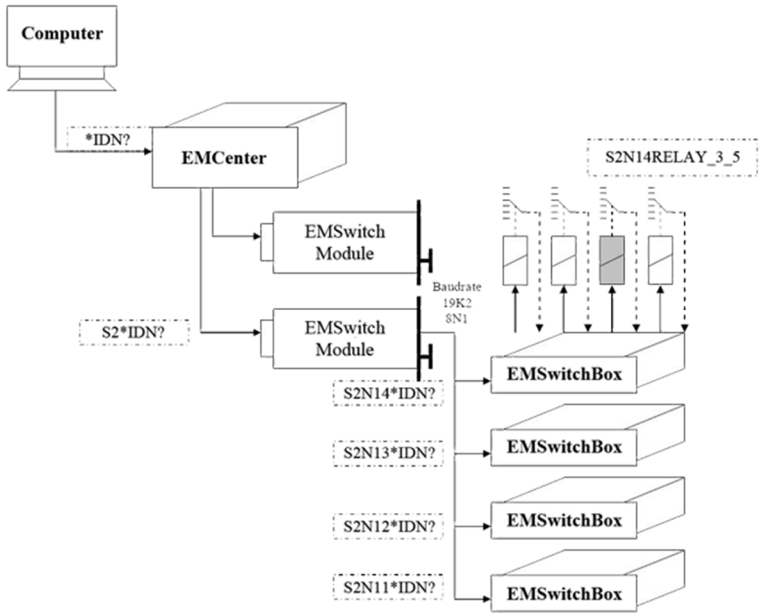
4 = Address of EMSwitch Remote Relay (configurable with DIP switches)

RELAY_ = Message to switch relay

3 = Number of switch on EMSwitch Remote Relay

_ = Separator

5 = Instruction to put switch in position 5



Note: If you receive an error code in response to a command, see page 37 for a list of error codes.

COMMAND SET—COMMON TO ALL EMSWITCH MODELS

Command / Description	Reply
*IDN? Request device identification.	Model, Version X.Y.Z **Example:** ETS-Lindgren, EMSwitch 7001-003, 3.5.10
LOCAL Return to local mode, the local display is used to set items.	—
RESET/n Reset (clear the current error).	—
ID_NUMBER? Request unique identifier number.	x.x.x.x.x.x.x.x
VERSION_SW? Returns the software version number.	x.y.z *OR* x.y *OR* x
VERSION_HW? Returns the hardware version number.	x.y.z *OR* x.y *OR* x

COMMAND SET—MODEL-SPECIFIC: 7001-001, 7001-002, 7001-011, 7001-012, 7001-021

Description / Command	Reply
Returns the status of internal relay 1 (2, 3, or 4). INT_RELAY_A? INT_RELAY_B? INT_RELAY_C? INT_RELAY_D?	NO *or* NC
Sets the internal relay A (B, C, or D) to NO. INT_RELAY_A_NO INT_RELAY_B_NO INT_RELAY_C_NO INT_RELAY_D_NO	NO *or* NC
Sets the internal relay A (B, C, or D) to NC. INT_RELAY_A_NC INT_RELAY_B_NC INT_RELAY_C_NC INT_RELAY_D_NC	NO *or* NC
Returns the analog temperature of the internal relay A (B, C, or D). INT_TEMPERATURE_A? INT_TEMPERATURE_B? INT_TEMPERATURE_C? INT_TEMPERATURE_D?	100 Three ASCII characters with temperature in degrees Celsius

Description / Command	Reply
Set switch 2 of EMSwitch Remote Relay 1 to position 3. N11RELAY_2_3	OK
Set switch 2 of EMSwitch Remote Relay 2 to position 4. N12RELAY_2_4	OK
Get position of switch 2 of EMSwitch Remote Relay 1. N11RELAY_2?	One of the following: !, 2, 3, 4, 5, 6
Get position of switch 3 of EMSwitch Remote Relay 2. N12RELAY_3?	One of the following: !, 2, 3, 4, 5, 6
Set switch type of switch 3 of EMSwitch Remote Relay 2 to 1 to 2, 1 to 3, 1 to 4, 1 to 5, or 1 to 6. N12RELAYTYPE_3_2 N12RELAYTYPE_3_3 N12RELAYTYPE_3_4 N12RELAYTYPE_3_5 N12RELAYTYPE_3_6	OK
Get switch type of switch 3 of EMSwitch Remote Relay 2. N12RELAYTYPE_2?	One of the following: 2, 3, 4, 5, 6
Disable readback to switch 3 of EMSwitch Remote Relay 2. N12READBACK_3_0	OK
Enable readback to switch 3 of EMSwitch Remote Relay 2. N12READBACK_3_1	OK
Get readback status to switch 3 of EMSwitch Remote Relay 2. N12READBACK_3?	0 (disabled) *OR* 1 (enabled)

COMMAND SET—MODEL-SPECIFIC: 7001-003, 7001-005, 7001-013, 7001-015

Description / Command	Reply
Returns status of internal relay A or B. INT_RELAY_A? INT_RELAY_B?	One of the following: 1, 2, 3, 4, 5, 6
Sets internal relay A or B. INT_RELAY_A_1 INT_RELAY_A_2 INT_RELAY_A_3 INT_RELAY_A_4 INT_RELAY_A_5 INT_RELAY_A_6	One of the following: 1, 2, 3, 4, 5, 6

Error Codes

Error Code	Description
ERROR_201	Switch error while trying to switch to NC (internal relays only)
ERROR_202	Switch error while trying to switch to NO (internal relays only)
ERROR_203	Temperature error NC (internal relays only)
ERROR_204	Temperature error NO (internal relays only)
ERROR_205	Interlock error (internal relays only)
ERROR_206	Error Switch A
ERROR_207	Error Switch B
ERROR_208	Error Switch
ERROR_209	Error external card
ERROR_210	Error no external card connected
ERROR_211	Error status unknown
ERROR_215	Error out of config

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9.0 Typical Data

Specifications of plug-in cards with SMA connectors

Specification	SMA, 18 GHZ, SPDT relays				
Life Time	10.000.000 cycles				
Frequency	GHz	0 to 3	3 to 8	8 to 12.4	12.4 to 18
VSWR		1.10	1.20	1.20	1.40
Insertion Loss	dB	0.15	0.20	0.25	0.35
Isolation	dB	80	75	65	60
Average Power	W	240	150	120	100

Specification	SMA, 18 GHZ, SP6T relays				
Life Time	5.000.000 cycles				
Frequency	GHz	0 to 3	3 to 8	8 to 12.4	12.4 to 18
VSWR		1.20	1.30	1.40	1.50
Insertion Loss	dB	0.20	0.30	0.40	0.50
Isolation	dB	80	75	65	60
Average Power	W	240	150	120	100

Specifications of plug-in cards with 2.92 mm connectors

Specification	K 2.92 mm, 40 GHz, SPDT relays					
Life Time	10.000.000 cycles					
Frequency	GHz	0 to 6	6 to 12.4	12.4 to 18	18 to 26.5	26.5 to 40
VSWR		1.30	1.40	1.50	1.70	1.9
Insertion Loss	dB	0.30	0.40	0.50	0.70	0.8
Isolation	dB	70	60	60	55	50
Average Power	W	80	60	50	20	10

Specification	K 2.92 mm, 40 GHz, SP6T relays					
Life Time	2.000.000 cycles					
Frequency	GHz	0 to 6	6 to 12.4	12.4 to 18	18 to 26.5	26.5 to 40
VSWR		1.30	1.40	1.50	1.70	2.2
Insertion Loss	dB	0.20	0.40	0.50	0.70	1.1
Isolation	dB	70	60	60	55	50
Average Power	W	40	30	25	15	5

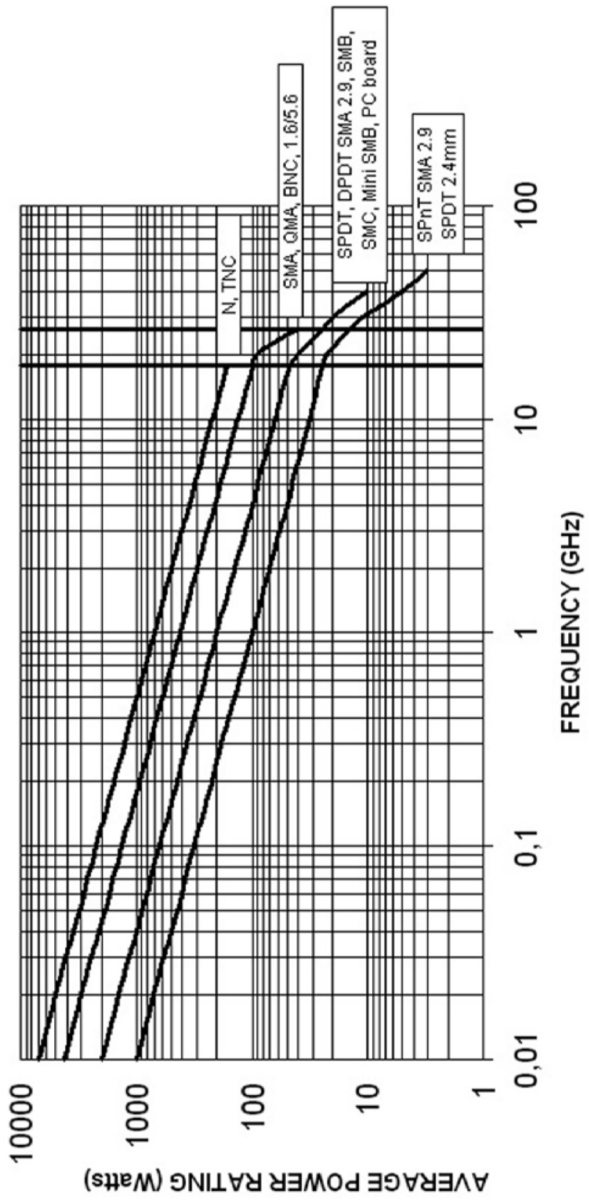
Power Handling

The RF power rating is the capability of handling RF power (CW power) through closed contacts. The RF power should be removed (turned off) before switching the relay.

Power ratings assume the following specifications; see the power handling data chart on page 42.

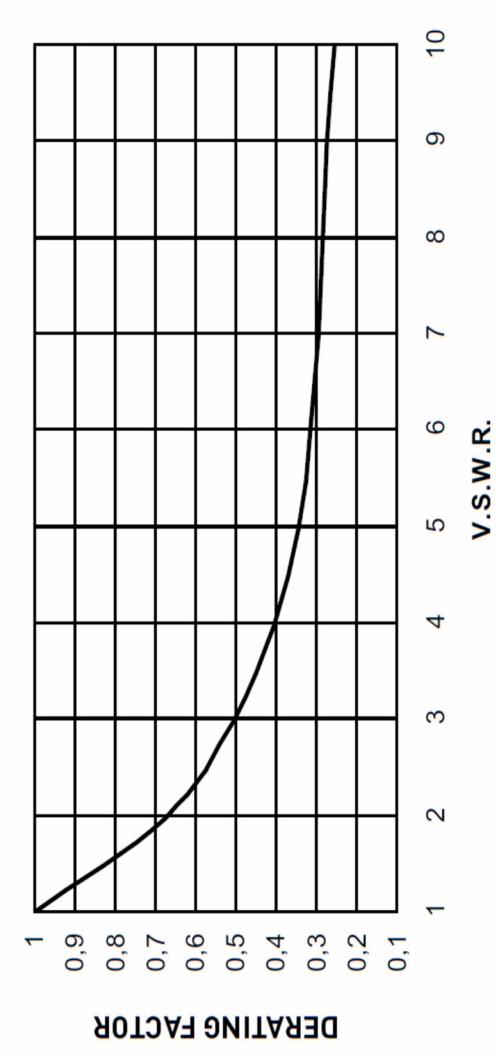
- Unity VSWR (matched load)
- Room temperature (25°C / 77°F)
- Sea level pressure (14.7 psi)
- Cold switching

Changes to these specifications require power derating; see the VSWR data chart on page 43.


AVERAGE POWER RATING (Watts)
10000
1000
100
10
1
0,01
0,1
1
10
100
FREQUENCY (GHz)
N, TNC
SMA, QMA, BNC, 1.6/5.6
SPDT, DPDT SMA 2.9, SMB, SMC, Mini SMB, PC board
SPnT SMA 2.9 SPDT 2.4mm

VSWR

The average power input must be reduced for load VSWR. above 1:1.



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Appendix A: EC Declaration of Conformity

ETS-Lindgren Inc. declares these products to be in conformity with the following standards, following the provisions of EMC-Directive 2004/108/EC:

EMSwitch RF Switch Plug-In Card

Emission: EN 61326-1:2006, Class B
Electrical equipment for measurement, control, and laboratory use.

Immunity: EN 61326-1:2006, Industrial level, performance criteria A
Electrical equipment for measurement, control, and laboratory use.

Technical Construction Files are available upon request.