GPIO Interface of SATEL Serial Radio Modules

The information below applies to the following radio modules:
- SATEL-TR4+
- SATEL-TR300
- SATEL-TR489
- SATEL-TR49
- SATEL-TR49 SnapOn
- SATELLINE-M3-TR9

GPIO (General Purpose Input Output) interface has been designed to improve the control signalling between the radio module and data terminal equipment (DTE).
GPIO interface contains eight user configurable lines (three inputs and five outputs). Each line can be assigned an applicable GPIO Mode listed on the table below.

NOTE1: a GPIO mode can be used only once in a device GPIO IN/OUT selection.
NOTE2: GPIO1…GPIO4 lines may have a configuration for other usages (Serial Port2 functions) that are mutually exclusive from GPIO modes described in this document. Therefore, it is recommended to prefer using GPIO5, GPIO 6, GPIO7 and GPIO8 lines.

GPIO Modes

Currently supported (status according FW version 07.xx.2.5.2.19) GPIO Modes are listed in the table below. The types "OUT" are for the output lines. The types "IN" applies to input lines.

GPIO Mode	Name	Description	Type
0	OFF	Default state (LOW state for output lines and HIGH state for input lines, due to internal pulling circuits)	IN/OUT
1	Radio Link Indicator	Indicates when radio receiver is active in data reception (radio layer). <u>GPIO line is HIGH</u> if the receiver has detected a signal -108 dBm or stronger. *Note.* Minimum duration of HIGH state = 200 ms. <u>GPIO line is LOW</u> if the receiver is not in active data reception.	OUT
2	Serial Data Indicator	Indicates when radio is active in serial interface (TD and RD lines), during which the <u>GPIO line is HIGH.</u> *Note.* Minimum duration of HIGH state = 200 ms. <u>GPIO line is LOW</u> if no data transmitted nor received through the serial interface.	OUT
3	Radio Link Indicator	Indicates when radio transmitter or receiver is active in data transmission (radio layer). <u>GPIO line is HIGH</u> when the transmitter is on (i.e. transmitting data) or the receiver is receiving data (reception possible only with signal that exceeds the set Signal Threshold parameter value).	OUT
4	Error Indicator	Reserved for special purposes	OUT
5	Power Indicator	GPIO line is HIGH while the radio module is powered and enabled	OUT
6	Radio Status Indicator	Reserved for special purposes	OUT
7	TxStatus-HighActive	GPIO line is HIGH when the transmitter is ON, otherwise LOW	OUT
8	TxStatus-LowActive	GPIO line is LOW when the transmitter is ON, otherwise HIGH	OUT
9	ON	GPIO line is in fixed HIGH state	OUT
10	GPIO Mode 10	Reserved for special purposes	OUT
11	GPIO Mode 11	Reserved for special purposes	OUT
12	RSSI High	GPIO line is HIGH if RSSI signal is **above** the set threshold value	OUT
13	RSSI Low	GPIO line is HIGH if RSSI signal is **below** the set threshold value	OUT

Configuration of GPIO Interface

GPIO interface can be configured by using:
- SATEL NETCO DEVICE software (on Advanced-user level)
- SATEL Configuration Manager software (on Maintenance-user level)
- SATEL SL commands

SW tools are available at SATEL WEB pages Downloads-section.

SATEL NETCO DEVICE software
Browse >*Editor* and then *GPIO* tab to configure GPIO lines.

SATEL Configuration Manager software
Browse >*Modem Settings* >*Misc settings* and then *GPIO* section to configure GPIO lines.

SATEL SL Commands
Format of SL%X= (Set GPIO functions) command:

SL%X=<GPIO_Number>,<GPIO_Type>,<GPIO_Mode><CR>
<GPIO_Number> specifies GPIO line to be configured (e.g. 8 = GPIO8)
<GPIO_Type> is type of GPIO line (0=input, 1=output)
<GPIO_Mode> is number of GPIO mode for the line (see the table above)
<CR> Carriage Return character

Response is OK or ERROR.

Format of SL%X? (Get GPIO functions) command:

SL%X?<GPIO_Number>
<GPIO_Number> specifies GPIO line (e.g. 8 = GPIO8)

Response is:

<GPIO_Status>,<GPIO_Type >,<GPIO_Mode> of the requested GPIO
<GPIO_Status> indicates the current status of GPIO line (0=LOW, 1=HIGH)
<GPIO_Type> Type of GPIO line (0=input, 1=output)
<GPIO_Mode> is number of GPIO mode configured for the line (see the table above)

Please refer to the user guide of a radio module for general information how to use SL commands. To get information of the latest and/or special SL commands please contact SATEL or local SATEL distributor:
https://www.satel.com/where-to-buy/

Note! Radio module responds with an error message if a non-applicable type of GPIO Mode is tried to be configured to the GPIO line.

Tip: SL commands can be tested by using SATELLINE Saterm terminal software. SL command is written to the Transmit window and thus sent to the radio module as a contiguous data message.

Physical/Electrical GPIO Interface

Eight pins of the 20-pin DTE connector (two-row 1.27 mm pitch socket) are dedicated for the GPIO lines.
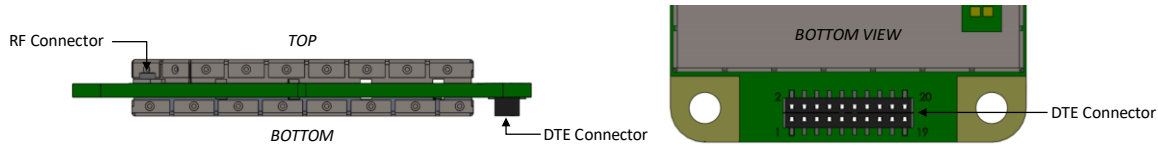
Pin Order of GPIO Interface in DTE Connector

Pin No. of DTE connector	Signal Name	Direction	Type	Function	Applicable GPIO Modes
1, 2	VCC_IN	IN	POWER, external voltage	DC input	-
3, 4	GND	-	GND, external ground	Ground reference for power and signals	-
5	VCC_IO	IN	POWER, external voltage	Supply voltage for IO lines	-
6	ENA_MOD	IN	IO, internal pull-down	Module ENA pin	-
7	RD1	OUT	HCMOS, output driver	Receive data, active low	-
8	CTS1	OUT	HCMOS, output driver	Clear to send, active low	-
9	TD1	IN	HCMOS, internal pull-up	Transmit data, active low	-
10	RTS1	IN	HCMOS, internal pull-up	Request to send, active low	-
11	**GPIO1 (RD2)**	**OUT**	**HCMOS, internal pull-down**	**User configurable**	**0-13**
12	**GPIO2* (CTS2)**	**OUT**	**HCMOS, internal pull-down**	**User configurable**	**0-13**
13	**GPIO3 (TD2)**	**IN**	**HCMOS, internal pull-up**	**User configurable**	**0**
14	**GPIO4 (RTS)**	**IN**	**HCMOS, internal pull-up**	**User configurable**	**0**
15	STAT	OUT	HCMOS, output driver	Various sequences	-
16	**GPIO5**	**IN**	**HCMOS, internal pull-up**	**User configurable**	**0**
17	SERVICE	IN	HCMOS, internal pull up	Input for service access, active low	-
18	**GPIO6**	**OUT**	**HCMOS, internal pull-down**	**User configurable**	**0-13**
19	**GPIO7**	**OUT**	**HCMOS, internal pull-down**	**User configurable**	**0-13**
20	**GPIO8**	**OUT**	**HCMOS, internal pull- down**	**User configurable**	**0-13**

*Ask availability.

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