Integration Manual

Synthesizer Transceiver Transmitter CSxxxTRT-1

with Feedback function

KH66983xxx61

End users may not be provided with this module installation instructions

Version	Date	Name	Comment
1.00	21.11.2014	ORD	Initial release documentation
1.00	02.02.2015	FRM	Frequency Allocation CS458TRT-1 changed (CH24&25)

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01 Description

The CSxxxTRT-1 is a transceiver RF-Module, wich has multiple functions.
The RF-Module can be used as following:

1. Transmitter or Receiver half duplex (Use the TX/RX Inpt to change the Mode Transmitter/Receiver)
2. Feedback Master (Decoder) or Feedback Slave (Encoder) for 3 LED-FB configuration.

The functions can be selected with the SIP.Switches for the frequency allocation and with the solder jumpers for the Transmitter/Receiver or feedback slave selection.

The counterpart of this module is the TRR (CSxxxTRR-1) with a receiver mounting and is more suitable to be used in a receiver-system.

This module has a ISP(In System Programming) Port, wich makes it flexible for later firmware changes.

The CSxxxTRT can work with serial data of 2400 to 19200 baud.

Integration instructions:
- This module may only used with the antenna listed in this document
- This module can only be used for devices not "body worn" and the separation distance between the user and the device must be greater than 20 cm.

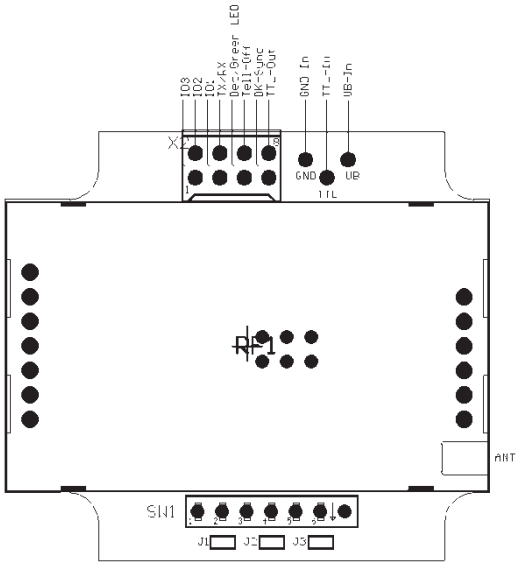
FCC § 15.105
Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules.
These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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.
.
ICES-003
This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

03 Technical Data

Supply Voltage:	3,4-12 VDC (empfohlen 3.4-5VDC)
Current drain:	<50 mA
Outputs:	TTL Data Output (Open drain with 4.7K pull up) DK-Sync Output (Open drain with 4.7K pull up) Telegram Out (Open drain with 10K pull up) 3xIO can be connected directly with LED's Antenna (connect with 50 Ohm antenna)
Inputs:	3xIO can be used as FB-Input 0-5V, for higher voltage use a seriel resistor Dekrement/Green LED Input (0-12V) TX/RX Input (0-12V) antenna (connect with 50 Ohm antenna) TTL Data Input (0-5V) 2400-19200
Temperature range:	-20° C to 70° C TX to RX or RX to TX
Change Time	10mS for temperature –10 to 50 C 20mS for temperature –20 to 70 C
Modulation	FSK Narrow

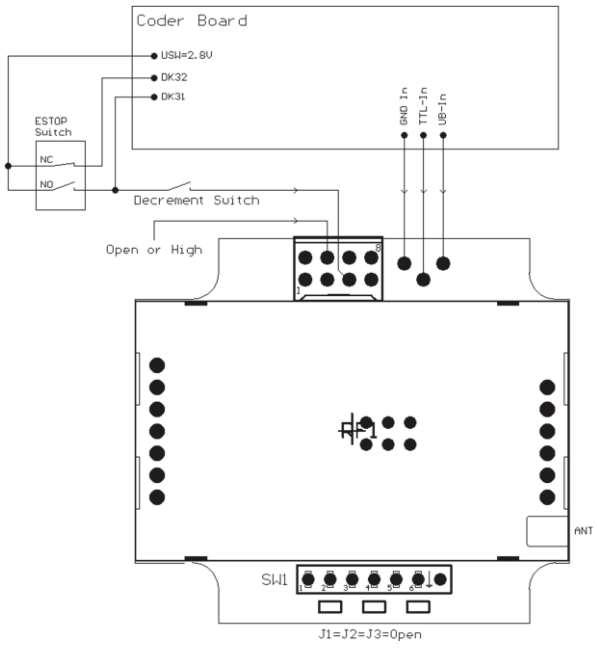
04 Connection Diagram

04.1 Standard Connection

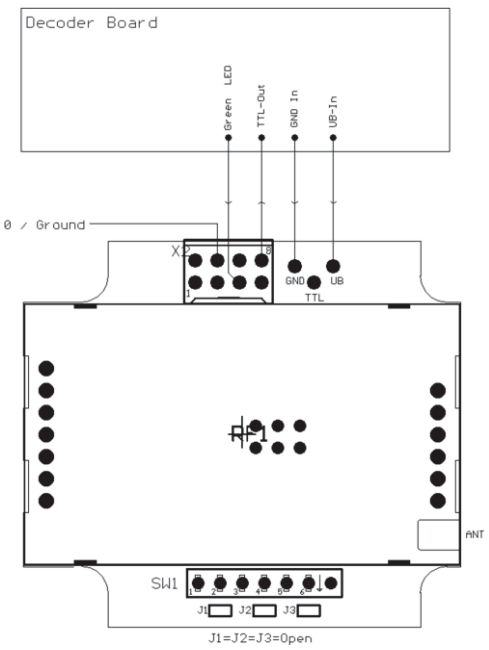


04.2 Modi

04.2.1 Connecting as Transmitter or Receiver



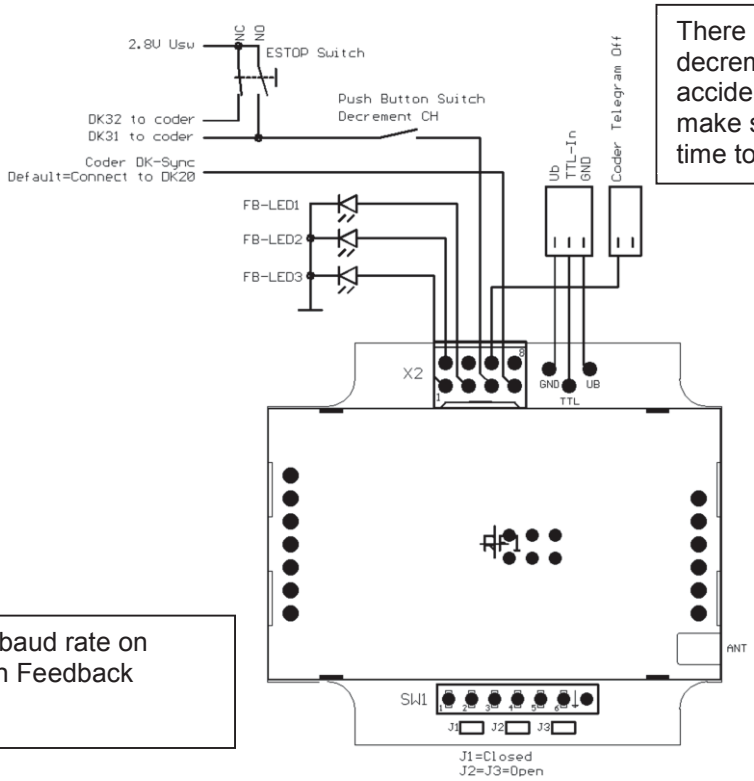
CSxxxTRT-1 as Transmitter



CSxxxTRT-1 as Reciever

There is a delay of 2s fo the decremental-switch to prevent an accidental channel change and to make sure that the coder has enough time to transmitt the ESTOP command.

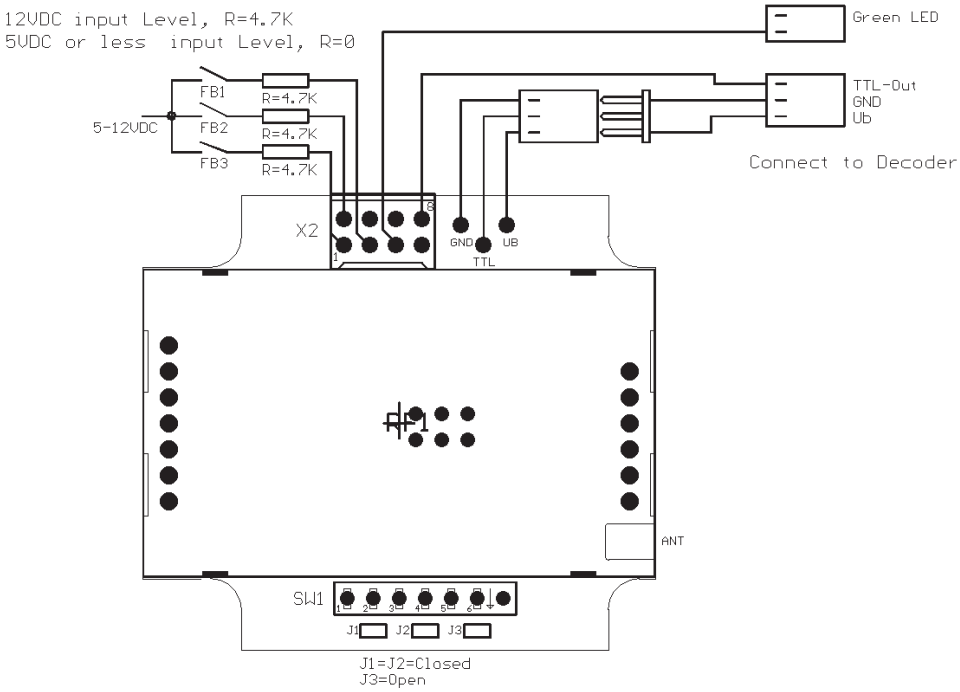
04.2.2 Connecting as Feedback Master (Control side)



There is a delay of 2s fo the decremental-switch to prevent an accidental channel change and to make sure that the coder has enough time to transmitt the ESTOP command.

Set the decoder baud rate on 4800, if the intern Feedback Feature is used.

04.2.3 Connecting as Feedback Slave (Machine side)



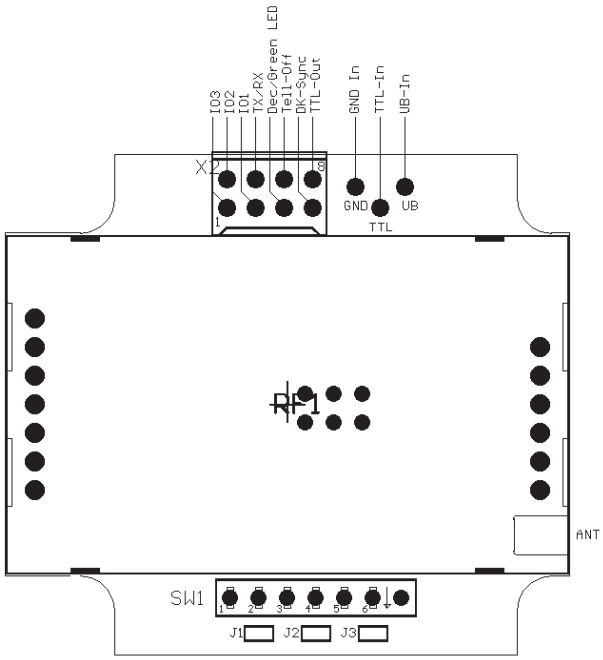
04.3 Jumper Configuration

J1	J2	J3	Function
Offen	**Offen**	**Offen**	Normal
Closed	Open	Open	FB-Master
Closed	Closed	Open	FB-Slave

Standard Einstellung

J3 = reserved

SW1 is the channel changing input (Manueller Kanal, AUTX/ FCS/ SCAN)



04.4 Installation-/Application Note

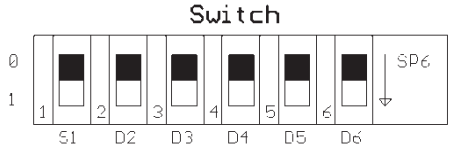
If the used RF-Module has a FCC/IC approval number, the number must be visible outside on the housing.

Warning:

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

04.5 Frequency Allocation

04.5.1 CS220TRT-1



Manuel Settings

D1 = 0

D2	D3	D4	D5	D6	Freq	CH
0	0	0	0	0	223.1000	0
0	0	0	0	1	223.7000	1
0	0	0	1	0	233.9750	2
0	0	0	1	1	224.6000	3
0	0	1	0	0	225.0250	4
0	0	1	0	1	225.3250	5

Automatic Settings

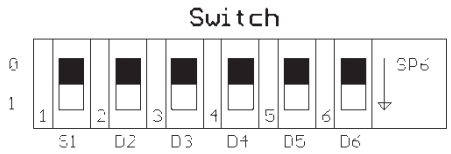
D1 = 1

Gr.Nr.	D4	D5	D6	Channels
1	0	0	0	5, 4, 3, 2, 1, 0
2	0	0	1	
3	0	1	0	

D2= 1 = FCS (Free Channel Search TX) und SCAN RX

D3= 1 = AUTX (Auto Channel Change TX) und SCAN-RX

04.5.2 CS419TRT-1



Manuel Settings

D1 = 0

D2	D3	D4	D5	D6	Freq	CH
0	0	0	0	0	418.9500	9
0	0	0	0	1	418.9750	10
0	0	0	1	0	419.0000	11
0	0	0	1	1	419.0250	12
0	0	1	0	0	419.0500	13
0	0	1	0	1	419.0750	14
0	0	1	1	0	419.1000	15
0	0	1	1	1	419.1250	16
0	1	0	0	0	419.1500	17
0	1	0	0	1	419.1750	18
0	1	0	1	0	419.2000	19
0	1	0	1	1	419.2500	21
0	1	1	0	0	419.2250	20
0	1	1	0	1	418.7250	0
0	1	1	1	0	418.7500	1
0	1	1	1	1	418.7750	2
1	0	0	0	0	418.8000	3
1	0	0	0	1	418.8250	4
1	0	0	1	0	418.8500	5
1	0	0	1	1	418.8750	6
1	0	1	0	0	418.9000	7
1	0	1	0	1	418.9250	8
1	0	1	1	0	419.2750	22
1	0	1	1	1	419.3000	23
1	1	0	0	0	419.3250	24
1	1	0	0	1	419.3500	25
1	1	0	1	0	419.3750	26
1	1	0	1	1	419.4000	27
1	1	1	0	0	419.4250	28
1	1	1	0	1	418.7250	0
1	1	1	1	0	418.7500	1
1	1	1	1	1	418.7750	2

Frequency for China

Automatic Settings

D1 = 1

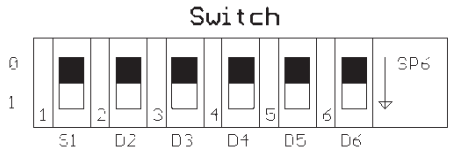
Gr.Nr.	D4	D5	D6	Channels
0	0	0	0	21, 19, 15, 10
1	0	0	1	18, 14, 11, 9
2	0	1	0	21, 19, 18, 17, 16, 15,14, 13, 12, 11, 10, 9
3	0	1	1	28, 26, 23, 19, 13, 5
4	1	0	0	25, 23, 20 16, 10, 2
5	1	0	1	24, 22, 19, 15, 9, 1
6	1	1	0	27, 21, 13, 11, 8, 4
7	1	1	1	26, 18, 14, 12, 6, 3

D2= 1 = FCS (Free Channel Search TX) und SCAN RX
D3= 1 = AUTX (Auto Channel Change TX) und SCAN-RX

Approval-Numbers	
USA	FCC ID 2AC8P-419TR1
Canada	IC: 12310A-419TR1

Approved antennas:
Wire antenna 185 mm, antenna gain: 2.15 dBi

04.5.3 CS429TRT-1



Manuel Settings

D1	D2	D3	D4	D5	D6	Freq	CH
1	1	1	0	0	0	429.2500	7
0	0	0	1	0	0	429.2625	8
1	0	0	1	0	0	429.2750	9
0	1	0	1	0	0	429.2875	10
1	1	0	1	0	0	429.3000	11
0	0	1	1	0	0	429.3125	12
1	0	1	1	0	0	429.3250	13
0	1	1	1	0	0	429.3375	14
1	1	1	1	0	0	429.3500	15
0	0	0	0	1	0	429.3625	16
1	0	0	0	1	0	429.3750	17
0	1	0	0	1	0	429.3875	18
1	1	0	0	1	0	429.4000	19
0	0	1	0	1	0	429.4125	20
1	0	1	0	1	0	429.4250	21
0	1	1	0	1	0	429.4375	22
1	1	1	0	1	0	429.4500	23
0	0	0	1	1	0	429.4625	24
1	0	0	1	1	0	429.4750	25
0	1	0	1	1	0	429.4875	26
1	1	0	1	1	0	429.5000	27
0	0	1	1	1	0	429.5125	28
1	0	1	1	1	0	429.5250	29
0	1	1	1	1	0	429.5375	30
1	1	1	1	1	0	429.5500	31
0	0	0	0	0	1	429.5625	32
1	0	0	0	0	1	429.5750	33
0	1	0	0	0	1	429.5875	34
1	1	0	0	0	1	429.6000	35
0	0	1	0	0	1	429.6125	36
1	0	1	0	0	1	429.6250	37
0	1	1	0	0	1	429.6375	38
1	1	1	0	0	1	429.6500	39
0	0	0	1	0	1	429.6625	40
1	0	0	1	0	1	429.6750	41
0	1	0	1	0	1	429.6875	42
1	1	0	1	0	1	429.7000	43
0	0	1	1	0	1	429.7125	44
1	0	1	1	0	1	429.7250	45
0	1	1	1	0	1	429.7375	46

Automatic Settings

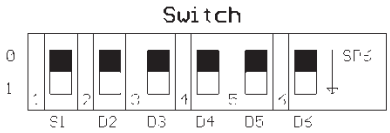
D4, D5, D6 = 0

Gr.Nr.	D1	D2	D3	Channels
0	0	0	0	7,15,27,43,11,19,31,23,35,39
1	1	0	0	8,16,28,44,12,20,32,24,36,40
2	0	1	0	9,17,29,45,13,21,33,25,37,41
3	1	1	0	10,18,30,46,14,22,34,26,38,42
4	0	0	1	no Function
5	1	0	1	no Function
6	0	1	1	Scan all channels

Approval-Numbers	
USA	FCC ID 2AC8P-429TR1
Canada	IC: 12310A-429TR1

Approved antennas:
Wire antenna 185 mm, antenna gain: 2.15 dBi

04.5.4 CS434TRT-1 Channel Set A



Manuel Settings

D1 = 0

D2	D3	D4	D5	D6	Freq	CH
0	0	0	0	0	433.0750	1
0	0	0	0	1	433.1000	2
0	0	0	1	0	433.1250	3
0	0	0	1	1	433.1500	4
0	0	1	0	0	433.1750	5
0	0	1	0	1	433.2000	6
0	0	1	1	0	433.2250	7
0	0	1	1	1	433.2500	8
0	1	0	0	0	433.2750	9
0	1	0	0	1	433.3000	10
0	1	0	1	0	433.3250	11
0	1	0	1	1	433.3500	12
0	1	1	0	0	433.3750	13
0	1	1	0	1	433.4000	14
0	1	1	1	0	433.4250	15
0	1	1	1	1	433.4500	16
1	0	0	0	0	433.4750	17
1	0	0	0	1	433.5000	18
1	0	0	1	0	433.5250	19
1	0	0	1	1	433.5500	20
1	0	1	0	0	433.5750	21
1	0	1	0	1	433.6000	22
1	0	1	1	0	433.6250	23
1	0	1	1	1	433.6500	24
1	1	0	0	0	433.6750	25
1	1	0	0	1	433.7000	26
1	1	0	1	0	433.7250	27
1	1	0	1	1	433.7500	28
1	1	1	0	0	433.7750	29
1	1	1	0	1	433.8000	30
1	1	1	1	0	433.8250	31
0	1	1	1	1	433.8500	32

Automatic Settings

D1 = 1

Gr.Nr.	D4	D5	D6	Channels
0	0	0	0	32, 22, 18, 16, 13, 5
1	0	0	1	31, 23, 19, 17, 11, 8
2	0	1	0	30, 28, 25, 21, 15, 7
3	0	1	1	29, 27, 24, 20, 14, 6
4	1	0	0	no Function
5	1	0	1	no Function
6	1	1	0	no Function
7	1	1	1	no Function

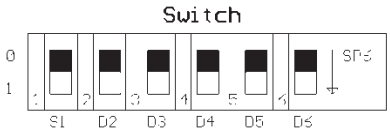
D2= 1 = FCS (Free Channel Search TX) und SCAN RX
D3= 1 = AUTX (Auto Channel Change TX) und SCAN-RX

Max. Power 10mW ERP, 100% allowed Duty Cycle in Europe
Max. Power 1mW ERP, 100% allowed Duty Cycle in Europe

Approval-Numbers		
USA	FCC-ID:	2AC8P-434TR1
Candada	IC-ID:	12310A-434TR1

Approved antennas:
Wire antenna 185 mm, antenna gain: 2.15 dBi

04.5.5 CS434TRT-1 Channel Set B



Manuel Settings

D1 = 0

D2	D3	D4	D5	D6	Freq	CH
0	0	0	0	0	433.1000	2
0	0	0	0	1	433.5500	20
0	0	0	1	0	434.0500	40
0	0	0	1	1	434.0750	41
0	0	1	0	0	434.1000	42
0	0	1	0	1	434.1250	43
0	0	1	1	0	434.1500	44
0	0	1	1	1	434.1750	45
0	1	0	0	0	434.2000	46
0	1	0	0	1	434.2250	47
0	1	0	1	0	434.2500	48
0	1	0	1	1	434.2750	49
0	1	1	0	0	434.3000	50
0	1	1	0	1	434.3250	51
0	1	1	1	0	434.3500	52
0	1	1	1	1	434.3750	53
1	0	0	0	0	434.4000	54
1	0	0	0	1	434.4250	55
1	0	0	1	0	434.4500	56
1	0	0	1	1	434.4750	57
1	0	1	0	0	434.5000	58
1	0	1	0	1	434.5250	59
1	0	1	1	0	434.5500	60
1	0	1	1	1	434.5750	61
1	1	0	0	0	434.6000	62
1	1	0	0	1	434.6250	63
1	1	0	1	0	434.6500	64
1	1	0	1	1	434.6750	65
1	1	1	0	0	434.7000	66
1	1	1	0	1	434.7250	67
1	1	1	1	0	434.7500	68
1	1	1	1	1	434.7750	69

Max. Power 10mW ERP, 100% allowed Duty Cycle in Europe
Max. Power 1mW ERP, 100% allowed Duty Cycle in Europe

Approval-Numbers		
USA	FCC-ID:	2AC8P-434TR1
Candada	IC-ID:	12310A-434TR1

Approved antennas:
Wire antenna 185 mm, antenna gain: 2.15 dBi

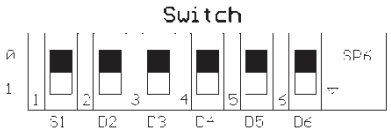
Automatic Settings

D1 = 1

Gr.Nr.	D4	D5	D6	Channels
0	0	0	0	68, 58, 54, 52, 49, 41
1	0	0	1	67, 59, 55, 53, 47, 44
2	0	1	0	66, 64, 61, 57, 51, 43
3	0	1	1	65, 63, 60, 56, 50, 42
4	1	0	0	38, 32, 28, 18, 10, 8, 5
5	1	0	1	37, 29, 25, 23, 17, 14, 4
6	1	1	0	36, 34, 31, 27, 21, 13, 3
7	1	1	1	35, 33, 30, 26, 20, 12, 2

D2= 1 = FCS (Free Channel Search TX) und SCAN RX
D3= 1 = AUTX (Auto Channel Change TX) und SCAN-RX

04.5.6 CS434TRT-1CS



Manuel Settings

D1 = 0

D2	D3	D4	D5	D6	Freq	CH	CS-CH
0	0	0	0	0	433,8750	33	A1
0	0	0	0	1	433,9000	34	B1
0	0	0	1	0	433,9250	35	A2
0	0	0	1	1	433,9500	36	B2
0	0	1	0	0	433,9750	37	A3
0	0	1	0	1	434,0000	38	B3
0	0	1	1	0	434,0250	39	A4
0	0	1	1	1	434,0500	40	B4
0	1	0	0	0	434,0750	41	A5
0	1	0	0	1	434,1000	42	B5
0	1	0	1	0	434,1250	43	A6
0	1	0	1	1	434,1500	44	B6
0	1	1	0	0	434,1750	45	A7
0	1	1	0	1	434,2000	46	B7
0	1	1	1	0	434,2250	47	A8
0	1	1	1	1	434,2500	48	B8
1	0	0	0	0	434,2750	49	A9
1	0	0	0	1	434,3000	50	B9
1	0	0	1	0	434,3250	51	A10
1	0	0	1	1	434,3500	52	B10
1	0	1	0	0	434,3750	53	A11
1	0	1	0	1	434,4000	54	B11
1	0	1	1	0	434,4250	55	A12
1	0	1	1	1	434,4500	56	B12
1	1	0	0	0	434,4750	57	A13
1	1	0	0	1	434,5000	58	B13
1	1	0	1	0	434,5250	59	A14
1	1	0	1	1	434,5500	60	B14
1	1	1	0	0	434,5750	61	A15
1	1	1	0	1	434,6000	62	B15
1	1	1	1	0	434,6250	63	A16
1	1	1	1	1	434,6500	64	B16

Max. Power 10mW ERP, 100% allowed Duty Cycle in Europe
Max. Power 1mW ERP, 100% allowed Duty Cycle in Europe

Approval-Numbers		
USA	FCC-ID:	2AC8P-434TR1
Candada	IC-ID:	12310A-434TR1

Approved antennas:
Wire antenna 185 mm, antenna gain: 2.15 dBi

Automatic Settings

D1 = 1

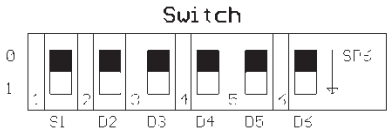
Gr.Nr	D4	D5	D6	Channels
0	0	0	0	61, 57, 53, 49, 45, 41, 37, 33
1	0	0	1	62, 58, 54, 50, 46, 42, 38, 34
2	0	1	0	63, 59, 55, 51, 47, 43, 39, 35
3	0	1	1	64, 60, 65, 52, 48, 44, 40, 36
4	1	0	0	63, 61, 59, 57, 55, 53, 51, 49, 47, 45, 43, 41, 39, 37, 35, 33
5	1	0	1	64, 62, 60, 58, 56, 54, 52, 50, 48, 46, 44, 42, 40, 38, 36, 34
6	1	1	0	no Function
7	1	1	1	no Function

D2= 1 = FCS (Free Channel Search TX) und SCAN RX
D3= 1 = AUTX (Auto Channel Change TX) und SCAN-RX

Comparision to CS434

Gr.Nr	J1	J2	J3	Description
0	O	O	C	8 Channel uneven A
1	O	O	O	8 Channel uneven B
2	O	C	C	8 Channel even A
3	O	C	O	8 Channel even B
4	C	O	C	16 Channel A
5	C	O	O	16 B

04.5.7 CS458TRT-1



Manuel Settings

D1 = 0

D2	D3	D4	D5	D6	Freq	Kanal
0	0	0	0	0	458.5000	0
0	0	0	0	1	458.5250	1
0	0	0	1	0	458.5500	2
0	0	0	1	1	458.5750	3
0	0	1	0	0	458.6000	4
0	0	1	0	1	458.6250	5
0	0	1	1	0	458.6500	6
0	0	1	1	1	458.6750	7
0	1	0	0	0	458.7000	8
0	1	0	0	1	458.7250	9
0	1	0	1	0	458.7500	10
0	1	0	1	1	458.7750	11
0	1	1	0	0	458.8000	12
0	1	1	0	1	458.8250	13
0	1	1	1	0	458.8500	14
0	1	1	1	1	458.8750	15
1	0	0	0	0	458.9000	16
1	0	0	0	1	458.9250	17
1	0	0	1	0	458.9500	18
1	0	0	1	1	458.9750	19
1	0	1	0	0	459.0000	20
1	0	1	0	1	459.0250	21
1	0	1	1	0	459.0500	22
1	0	1	1	1	459.0750	23
1	1	0	0	0	459.1000	24
1	1	0	0	1	459.1250	25
1	1	0	1	0	459.1500	26
1	1	0	1	1	459.1750	27
1	1	1	0	0	459.2000	28
1	1	1	0	1	458.5000	0
1	1	1	1	0	458.5250	1
1	1	1	1	1	458.5500	2

UK Kanäle

Approval-Numbers		
USA	FCC-ID:	2AC8P-458TR1
Candada	IC-ID:	12310A-458TR1

Approved antennas:
Wire antenna 185 mm, antenna gain: 2.15 dBi

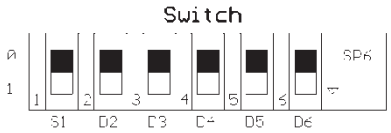
Automatic Settings

D1 = 1

Gr.Nr.	D4	D5	D6	Channels
1	0	0	0	18, 15, 10, 3, 1
2	0	0	1	17, 14, 9, 2, 0
3	0	1	0	18, 12, 8, 5, 3
4	0	1	1	17, 11, 7, 4, 2
5	1	0	0	27, 19, 16, 14, 10, 0
6	1	0	1	24, 15, 13, 9, 6, 1
7	1	1	0	26, 18, 12, 8, 5, 3
8	1	1	1	25, 17, 11, 7, 4, 2

D2= 1 = FCS (Free Channel Search TX) und SCAN RX
D3= 1 = AUTX (Auto Channel Change TX) und SCAN-RX

04.5.8 CS869TRT-1



Manuel Settings

D1 = 0

D2	D3	D4	D5	D6	Freq	Ch
0	0	0	0	0	869.3000	52
0	0	0	0	1	869.3250	53
0	0	0	1	0	869.3500	54
0	0	0	1	1	869.3750	55
0	0	1	0	0	869.4000	56
0	0	1	0	1	869.7000	68
0	0	1	1	0	869.7250	69
0	0	1	1	1	869.7500	70
0	1	0	0	0	869.7750	71
0	1	0	0	1	869.8000	72
0	1	0	1	0	869.8250	73
0	1	0	1	1	869.8500	74
0	1	1	0	0	869.8750	75
0	1	1	0	1	869.9000	76
0	1	1	1	0	869.9250	77
0	1	1	1	1	869.9500	78
1	0	0	0	0	869.9750	79
1	0	0	0	1	870.0000	80
1	0	0	1	0	869.4250	57
1	0	0	1	1	869.4500	58
1	0	1	0	0	869.4750	59
1	0	1	0	1	869.5000	60
1	0	1	1	0	869.5250	61
1	0	1	1	1	869.5500	62
1	1	0	0	0	869.5750	63
1	1	0	0	1	869.6000	64
1	1	0	1	0	869.6250	65
1	1	0	1	1	869.6500	66
1	1	1	0	0	869.6750	67
1	1	1	0	1	868.0000	0
1	1	1	1	0	868.2500	10
1	1	1	1	1	868.5000	20

Erlaubter Duty Cycle 100%
Erlaubter Duty Cycle 1%
Erlaubter Duty Cycle 0.1%
Erlaubter Duty Cycle 10%

Automatic Settings

D1 = 1

Gr.Nr.	D4	D5	D6	Channels
1	0	0	1	75, 71, 68, 54, 52
2	0	0	0	76, 72, 69, 55, 53
3	0	1	1	79, 77, 73, 70, 56
4	0	1	0	78, 76, 73, 69, 55
5	1	0	1	66, 62, 59, 57
6	1	0	0	67, 63, 60, 58
7	1	1	1	24, 19, 16, 7, 3, 1
8	1	1	0	23, 18, 15, 6, 2, 0

D2= 1 = FCS (Free Channel Search TX) und SCAN RX
D3= 1 = AUTX (Auto Channel Change TX) und SCAN-RX