

TCS MKII RS232 Control Codes

TCS MKII utilizes RS232 communication channel to communicate with PC and other Tact units. TCS MKII RS232 port is set to **57600** baud rate, 8 data bits, 1 stop bit and no parity.

To send data or commands to TCS MKII, PC software sends variable length data packet. Each packet consists of N bytes. Packets are structured in the following way:

Byte #0 = **N** - number of bytes in the packet
Byte #1 = **A0** - Least significant address byte
Byte #2 = **A1** - Most significant address byte
Byte #3 = **CC** - Command code byte
Byte #4 = **D0** - First data byte
Byte #5 = **D1** - Second data byte
....
Byte #(N-2) = Last data byte
Byte #(N-1) = Check sum byte

All bytes are copied into COMM_TxBuffer() and then transmitted. Last byte contains packet check sum. Check sum is computed in the following way:

TCS can recognize two different addresses:

Device Address Device address is composed of 0x8000 and the actual device address assigned to each unit connected to the control bus.

Example: If address 0x1 is assigned to TCS, then

A0 = 0x01

A1 = 0x80

Device Address should not equal Global Address.

Global Address TCS Global address is set to 0x9000. This address is used to reprogram TCS firmware. It is not recommended for use in TCS normal operation.

A0 = 0x90

A1 = 0x00

```
Check_Sum = 0
For i = 0 To n - 2
    Check_Sum = Check_Sum + COMM_TxBuffer(i)
Next
Check_Sum = Check_Sum & &HFF
```

Where ‘&’ indicates logical bit wise AND operation.

All Tact components connected to the PC will receive transmitted packets. The only component that will respond to the received message is the one that matches its internal address with the received one. All others will ignore entire packet. Addressed component could respond by sending a packet of its own to acknowledge received packet, or send back requested information, or not to respond at all depending on the received command code.

The following is a description of RS232 codes used to control basic functions of TCS MKII preamplifier. These codes can be supplied to custom installers to link Tact products to RS232 remote controls.

In the command description code it is assumed that TCS MKII device address as displayed on the TSC MKII front panel is set to 1.

Communication Test	CC = 1
---------------------------	---------------

This command is used to test RS232 communication channel. It can be used to detect if Tact component with specified address is connected to PC.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0 – Least significant address byte
2	0x80	A1 – Most significant address byte
3	1	CC – command code
4	135	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Note: Device address is calculated as:

$$\text{Device Address} = 0x8000 + 256 * A1 + A0$$

$$256 * A1 + A0 < 4096$$

Note: 0x80 is standard 'C' language notation for a hex number.

TCS MKII RS 232 Control Codes

Power Status	CC = 2
---------------------	---------------

This command is used to check if TCS MKII is turned on or it is in the standby mode.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	2	CC – command code
4	136	Check sum

Received packet:

Byte#	Value	Description
0	3	Packet size
1	0xaa	Acknowledgement byte
2	Power	Power = 0, TCS MKII is in standby mode Power = 1, TCS MKII is turned on

If received packet is not equal to above description communication error has occurred.

Power On	CC = 100
-----------------	-----------------

This command is used to turn TCS MKII on.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	100	CC – command code
4	234	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Note: When in standby TCS MKII is placed in low power consumption mode. To disconnect TCS MKII power use main power switch located on the back of the unit.

Note: The acknowledgement packet is received with a delay that depends on TCS MKII front panel AMP menu setup. If any of the AMP options is set to EN the acknowledgement packet delay time is approximately 13 seconds.

If all AMP options are set to DIS the acknowledgement packet delay time is approximately 5 seconds.

Power OFF	CC = 101
------------------	-----------------

This command is used to put TCS MKII into standby mode.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	101	CC – command code
4	235	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Note: When in standby TCS MKII is placed in low power consumption mode. To disconnect TCS MKII power use main power switch located on the back of the unit.

Note: The acknowledgement packet is received with a delay that depends on TCS MKII front panel AMP menu setup. If any of the AMP options is set to EN the acknowledgement packet delay time is approximately 10 seconds.

If all AMP options are set to DIS the acknowledgement packet delay time is approximately 3 seconds.

Power Toggle	CC = 102
---------------------	-----------------

This command functions in the following way:

- It TCS MKII is in standby mode it will turn it on
- If TCS MKII is on it will place it into standby mode.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	102	CC – command code
4	236	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Note: When in standby TCS MKII is placed in low power consumption mode. To disconnect TCS MKII power use main power switch located on the back of the unit.

Note: The acknowledgement packet is received with a delay that depends on TCS MKII front panel AMP menu setup. If any of the AMP options is set to EN the acknowledgement packet delay time is approximately 10 seconds when TCS MKII is placed into standby mode and 13 seconds when TCS MKII is turned on.

If all AMP options are set to DIS the acknowledgement packet delay time is approximately 3 seconds when TCS MKII is placed into standby mode and 5 seconds when TCS MKII is turned on.

Select Digital Input	CC = 103
-----------------------------	-----------------

This command is used to select digital input.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0x80	A1
3	103	CC – command code
4	Input	0,1,2,3,4,5,6,7,8
5	xx	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Note: Check sum = 6 + 1 + 128 + 103 + Input

Input	Check sum
0	238
1	239
2	240
3	241
4	242
5	243
6	244
7	245
8	246

Sequence Digital Inputs	CC = 104
--------------------------------	-----------------

This command is used to sequence through all possible digital inputs. It is equivalent to pressing DIGITAL remote control button.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	104	CC – command code
4	238	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Select Analog Input	CC = 105
----------------------------	-----------------

This command is used to select analog input.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0x80	A1
3	105	CC – command code
4	Input	0,1,2,3,4,5,6
5	xx	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Note: Check sum = 6 + 1 + 128 + 105 + Input

Input	Check sum
0	240
1	241
2	242
3	243
4	244
5	245
6	246

Sequence Analog Inputs	CC = 106
-------------------------------	-----------------

This command is used to sequence through all possible analog inputs. It is equivalent to pressing ANALOG remote control button.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	106	CC – command code
4	240	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Mute	CC = 107
-------------	-----------------

This command is used to mute or un-mute TCS MKII.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0x80	A1
3	107	CC – command code
4	M	M = 1 mute M = 0 un-mute
5	xx	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

M = 0 Check sum = 6 + 1 + 128 + 107 + 0 = 242

M = 1 Check sum = 6 + 1 + 128 + 107 + 1 = 243

Mute Toggle	CC = 108
--------------------	-----------------

This command emulates remote control MUTE button. It will toggle TCS MKII mute on and off.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	108	CC – command code
4	242	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Set Master Level	CC = 109
-------------------------	-----------------

This command is used to set TCS MKII master level control.

Transmitted packet:

Byte#	Value	Description
0	8	Packet size
1	1	A0
2	0x80	A1
3	109	CC – command code
4	Return	Return = 0, acknowledgement is not sent back Return = 1, acknowledgement is sent back
5	M-MSB	Master level – list significant byte
6	M-LSB	Master level – most significant byte
7	xx	Check sum

Received packet:

Return = 0

NONE

Return = 1

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Note: Master level is set between 0 and 999. Minimum value corresponds to 0 and maximum value corresponds to 999.

Example: If master level is to be set to 62.0 M-LSB should be set to 108 and M-MSB should be set to 2.

Return = 1

Master Level = 62.0

62.2 → 620 → 0x026C → M-MSB = 0x02, L-MSB = 0x6C (108)

Check_Sum = 8 + 1 + 0x80 (128) + 109 + 1 + 0x02 (2) + 0x6C (108) = 0x165 (357)

Check_Sum = Check_Sum & 0xFF = 0x65 (101)

Master Level Up/Down	CC = 110
-----------------------------	-----------------

This command emulates VOLUME UP/DOWN remote control buttons.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0x80	A1
3	110	CC – command code
4	Up/Dn	Up/Dn = 1 increment master level by 1 Up/Dn = 0 decrements master level by 1
5	xx	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Note: Master level is set between 0 and 999. Minimum value corresponds to 0 and maximum value corresponds to 999.

Up/Dn = 0 Check sum = 245

Up/Dn = 1 Check sum = 246

Set Correction	CC = 111
-----------------------	-----------------

This command is used to set bypass or one on nine correction presets.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0x80	A1
3	111	CC – command code
4	COR	COR = 0 Bypass COR = 1 Correction preset #1 ... COR = 9 Correction preset # 9
5	xx	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Check sum = 6 + 1 + 128 + 111 + COR

COR	Check sum
BP	246
1	247
2	248
3	249
4	250
5	251
6	252
7	253
8	254
9	255

Acknowledgement packet is received with a delay of approximately 2 seconds.

Menu Button	CC = 112
--------------------	-----------------

This command emulates TCS MKII remote control MENU button.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	112	CC – command code
4	246	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Left Button	CC = 113
--------------------	-----------------

This command emulates TCS MKII remote control LEFT button.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	113	CC – command code
4	247	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Right Button	CC = 114
---------------------	-----------------

This command emulates TCS MKII remote control RIGHT button.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	114	CC – command code
4	248	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Up Button	CC = 115
------------------	-----------------

This command emulates TCS MKII remote control UP button.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	115	CC – command code
4	249	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Down Button	CC = 116
--------------------	-----------------

This command emulates TCS MKII remote control DOWN button.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	116	CC – command code
4	250	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Select Button	CC = 117
----------------------	-----------------

This command emulates TCS MKII remote control ENTER button.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	117	CC – command code
4	251	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Video Button	CC = 118
---------------------	-----------------

This command emulates TCS MKII remote control VIDEO button.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	118	CC – command code
4	252	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

Get Master Level and Mute	CC = 119
----------------------------------	-----------------

This command is used to receive TCS MKII master level and mute information.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	119	CC – command code
4	253	Check sum

Received packet:

Byte#	Value	Description
0	5	Packet size
1	0xaa	Acknowledgement byte
2	L_MSB	Master level most significant byte
3	L_LSB	Master level least significant byte
4	Mute	Mute = 0, TCS MKII is not muted Mute = 1, TCS MKII is muted

If received packet is not equal to above description communication error has occurred.

Note: Master Level = L_MSB * 256 + L_LSB

Get Status	CC = 120
-------------------	-----------------

This command is used to receive TCS MKII active correction preset, digital and analog input selection.

Transmitted packet:

Byte#	Value	Description
0	5	Packet size
1	1	A0
2	0x80	A1
3	120	CC – command code
4	254	Check sum

Received packet:

Byte#	Value	Description
0	7	Packet size
1	0xaa	Acknowledgement byte
2	Corr	Current correction preset Corr = 0 – Bypass Corr = 1 – Correction preset #1 . Corr = 9 – Correction preset #9
3	A/D	A/D = 0 digital input is selected A/D = 1 analog input is selected
4	D_In	Selected digital input D_In = 0,1,2,3,4,5,6,7,8
5	A_In	Selected analog input A_In = 0,1,2,3,4,5,6
6	STP	0 – PL = OFF, NEO:6 = OFF 1 – PL = ON, NEO:6 = OFF 2 – PL = OFF, NEO:6 = ON

If received packet is not equal to above description communication error has occurred.

STP	CC = 121
------------	-----------------

This command is used to set stereo processing mode as displayed in TCS MKII front panel STP menu.

Transmitted packet:

Byte#	Value	Description
0	6	Packet size
1	1	A0
2	0x80	A1
3	121	CC – command code
4	STP	STP = 0 PL and NEO are OFF STP = 1 PL is ON STP = 2 NEO is ON
5	xx	Check sum

Received packet:

Byte#	Value	Description
0	2	Packet size
1	0xaa	Acknowledgement byte

If received packet is not equal to above description communication error has occurred.

STP = 0 Check sum = 6 + 1 + 128 + 121 + 0 = 0
STP = 1 Check sum = 6 + 1 + 128 + 121 + 1 = 1
STP = 2 Check sum = 6 + 1 + 128 + 121 + 2 = 2