Raytech GmbH
SWITZERLAND

Oberebenestrasse 11
5620 Bremgarten
Switzerland

Tel. +41 56 648 60 10
Fax. +41 56 648 60 11

Command Set

TR Mark III

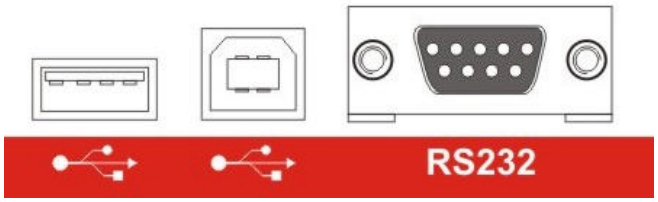
TR Mark IIIR

Version 0.05

All rights reserved. No portion may be reproduced without written consent

TR Mark III Communication Port

1 Hardware Connection



1.1 Serial Interface RS232

9 pole D-Sub
Pin 2 TXD Data Mk3 to Computer
Pin 3 RXD Data Computer to Mk3
Pin 7 GND
+/- 12 V Signals
Protocol: 19200 Baud, 8 Bit, 1 Stop bit, no parity

1.2 USB Device

There are two basic modes to communicate over USB. Raytech USB Driver and Microsoft Active Sync

1.2.1 Raytech USB Driver (recommended)

To communicate with USB use the Raytech USB Driver found in the Raytech.NET Toolbox V2
To enable the USB driver in the TR Mark III, it is necessary to enter the Service Code 2001.

1.2.2 Active Sync

To work with Active Sync it is necessary to enter Service Code 2000.

2 Software Protocol

Required firmware version 3.0.85 and later.
Do not use former Versions for Remote Control. Check the updates from www.raytech.ch or Call us for updates.

2.1 Switch to Remote

The Device is switched to REMOTE

- Command “RM”
- Every command which is executing a measurement (MA,MB,MC,MF)
- Error and warnings are redirected to the host interface
- Messages sent to Screen (MessageBox) are redirected to the host interface.

2.2 Switch to Local

With Command SL (Set to Local) or with the Local Button on the Remote Display.

2.3 Syntax of Commands

„cc [Data1[;Data]..]CR
cc = Characters for the Command
‘, (colon or space) Separator for multiple Data fields
Numeric Format of Numbers: float (C - Language), “.” as decimal point
Terminator: „CR“ (0x0D) or LF (0x0A) or CR+LF

2.4 Answers

Answers without data

"*0 ok"	ok
"*1 unkn"	Syntax Error
"*2 Error"	Error during command execution
"*3 Emerg"	Emergency pressed
"*4 Range"	Parameter out of Range
"*6 Wait"	Measurement started, wait for Results
"*7 TapInput"	When Remote screen (RM Command) state of TapChanger Input
"*8 Error"	Internal Error,Redirected to Host
"*9 Msg"	MessageBox Message redirected to Host
"*99 No Authorization"	No Valid Licence installed

Answers with data
xx,Message1[,Message2;[Message3]..]“,CR
xx Type of answer (the command itself)

Answers with more than 1 line of response are terminated with *0 ok

2.5 TR Mark III Commands

SL	Set Local	Set TR Mark III to local State
SLR	Set Local	Set TR Mark III to local State, "Trafo Setup Menu"
SLX	Set Local	Set TR Mark III to local State with a Warmboot Ret: "*0 ok"
RM	Set Remote	Set TR Mark III to Remote State All Keys except "Set Local" are locked
GV p	Get Version	Get Version of TR Mark III, Release of the Firmware, Date of Firmware "gv" "TR MARK III 3.0028 28.08.10" "gv 1" (short form) "SPY 3.0"
GS	Get Serial Number	Asks the internal serial number The Serialnumber is unique for each TR Mark III e.g. gs „GS 301-097"
SO abcdef	Set Options	Set Options (Legacy Command -> USE Setstd/?setstd) abc not defined d [0..3] Sets the used default Standard 0-> IEC Standard 1-> ANSI Standard 2-> Australian Standard ef not defined Invalid parameters are ignored Ret: actual Parameters "SO ABCDEF" Example: SO …1 Sets Default Standard to Value ANSI, invalid values are ignored Rsp = "SO 000100"
SETSTD p	*Set Standard*	*p = [IES,ASNI,AUS]* *Rsp =* *"*0 Ok",* *if ok* *"*4 Range"* *if Standard unknown*
?SETSTD	*Get Standard*	*Rsp = [IEC,ANSI,AUS]*

STT a,b[,c,d,e,f .] Set Transformer type

a => Primary Setup [Y,YN,Z,D,S,C,3P]
b => Secondary Setup [y,yn,ya,z,zn,d,S,C,3p]
c => Vector Group [0..11,?]
d => Test voltage [1V,10V,40V,100V,Auto,Ext]
e => Number of Taps Primary
f => First tap Primary
g => Number of Taps Secondary []
h => First tap Secondary [ ]

i=> Tertiary Setup (Codes like Parameter b)
j=> Vector Group (Codes like Parameter c)
k => Test voltage (Codes like Parameter d)
l => Number of Taps Tertiary (Codes like Parameter g)
m => First tap Tertiary (Codes like Parameter h)

“,” delimiter may be also “:-,;”
Parameters c .. f are optional, default values “,?,Auto,1,0”
Example:
STT D:yn-5,40,21,-10 Transformer: D:yn-5
Test voltage 40V
Taps: -10..+10 (Total 21 Taps)

Example:
STT D:yn-5,40,21,-10,1,0,yn-7,100,5,-2 Transformer: D:yn-5:yn-7
Test voltage 40V, 100V
Taps P: -10..+10
Taps S: 0
Taps T: -2..+2

Ret:
“*0 ok”
“*4 Range” Parameter out of range

?TT Get Trafo Type Get the type of the actual Transformer
Ret: ?TT (see command stt parameter j..h only when available)
Example
?TT Y,D-3,40,11,-5,1,1

Set Name Plate Information of Transformer

STA0 “Text” Sets Transformer “Type” Info
STA1 “text” Sets “Serial Number” Info
STA2 “text” Sets "Operator" Info
STA3 “text” Sets "Location" Info
STA4 “text” Sets "Remarks" Info
STA5 “text” Sets "Manufacture" Info

?TA Get Transformer Additional Information
Ret: ?TA Type, S/N Test object, Operator, Location, Remarks, Manufacturer
Example
?TA
?TA "H8-35S","123.435.223","JW","Brem-54 ","ok",”X”

Set Reference

SR 0 Set Reference Set Reference to No Ref.
„*0 ok“

SR 1,ratio Set Ref to Ratio
“*0 ok”

SR 2,prim,sec — Set Nominal Voltage prim/sec

SR 3,ws,tap,volt[,name] — Set Nominal Voltage to each Tap Position
Ws = Winding System [1,2,3] Prim, Sec, Tert ..
tap = Tap Index (FirstTap = 0)
volt = UNom [V] of Tap
name = Name of Tap

?SR ws,tap — Get Reference of Winding ws Tap tap
ws = Winding System [1,2,3] Prim, Sec, Tert ..
tap = Tap Index (FirstTap = 0)
resp ?SR, volt, name

?SR ws1,tap1,ws2,tap2 — Get Reference for Pim/sec pair
ws1,ws2 = Winding System [1,2,3] Prim, Sec, Tert ..
tap1,tap2 = Tap Index (FirstTap = 0)

?SR 1,0,2,0
e.g ?sr 10000,500,20,20
=> Primary 0 Unom = 10000 V
Secondary 0 Unom = 500 V
Voltage Ratio = 20
Turn Ratio = 20

?TG — Get General Info of Transformer
Rsp: ?TG, ,date,time,standard
Date and time of the last measurement
Example:
?TG,1,110102,1232,2

?TM Get Actual Measurement of the Actual Tap
?TMA Get all Measurements of all Taps
?TM n,m Get Actual measurement of Prim Tap n / Sec Tap m n,m [0 .. TapCount-1]
Rsp: ?TM,tapname,ra,pa,ca,rb,pb,cb,rc,pc,cc
tapname :
r_: Ratio
p_: Phase
c_: Current
_a: Phase A _b: Phase B _c: Phase C
Example
?TMA (Single Phase Transformer with 3 Taps)
?TM,-1,9.99135,-0.0292503,0.1875,0,0,0,0,0,0
?TM,+0,10.01,-0.0180002,0.2375,0,0,0,0,0,0
?TM,+1,10.0149,-0.0135001,0.175,0,0,0,0,0,0

Use STV 2 or STV 3 command to switch between Prm:Sec and Prim:Tert

STV 2 Set Vector Group — Sets the Current Vector Group of Current Measurement Prim to Sec
STV 3 Set Vector Group — Sets the Current Vector Group of Current Measurement Prim to Tert
?STV Get Vector Group — ?STV
Rsp: ?STV,2,Yn:d-0

?RE Get Relays Config from actual Transformer
Ret: ?RE,Prim:Sec-vg,RelPA:RelSA,RelPB:RelSB,RelPC:RelSC
Example:
?RE Y:D-3,A-BC:c-b,B-CA:a-c,C-AB:b-a
Use STV 2 or STV 3 command to switch between Prm:Sec and Prim:Tert

GA n[,b] Get Results A

GB n[,b]	Get Results B	
GC n[,b]	Get Results C	Asks the Results of the measured Values for Phase A,B or C from the actual Tap Result: „Mx,a,b,c“ x = [A,B,C] Phase a -> Ratio of Phase x b-> Angle of Phase deviation of Phase x (units in degrees) c -> Current of Phase x (in mA) With Parameter n: Actual Tap is set to n[,b] (with command TS x)
MA,x	Measure Phase A	
MB,x	Measure Phase B	
MC,x	Measure Phase C	Measures Phase A,B or C of the actual Tap x = “ “ Send only finial result x = 1 during measuring, the actual Values are sent to the Host Syntax see Command GA,GB,GC After approx. 10 sec the TRMarkIII stops automatically x = 11 measure and display values of the Transformer without time-out A new command stops the mode Ret: “*6 Wait” immediately to confirm command “*0 ok“ Measurement stopped “*3 Emerg” Emergency pressed Results: Line MH Prim Setup, Sec Setup, Vectorgroup, Testvoltage, Relais Config Line Mx Ratio, Angle, Current[mA] e.g *6 Wait MH,A,Yn,Y,0,100V,1U-1W1N:2U-2W2N MA,1.000013,0.00089725,0.0003432501 *0 Ok
MF,x	Measure Full	Measure all Phases of the actual Tap x = “ “ Process without showing results x = 1 Results are sent to the computer Ret: “*6 Wait” immediately to confirm command “*0 ok” after approx. 3 * 10 sec when the measurement stops
TS a	Tap Set	Sets the actual Tap (FirstTap = 0) a = Tap Primary [FirstTap ... LastTap]
TS tp,ts		Set Tap Index tp = Tap Prim [0.. TapCount-1] ts = Tap Sec [0.. TapCount-1]
TC		TapChanger Control
TC0		Reset Output Relais
TC1		Sets Output Relais Rsp: TC,p P State of the TapChanger input
XT ddMMyyhhmm		Sets the Time on TR Mark III a = ddMMyyhhmm
XTL n		n = DateTime as Tickcount Long Integer
?XT		Rsp = “ddMMyyhhmm”
?XTL		Rsp = Long Int DateTime.Now.Ticks

DATAEXCHANGEGETTRAFOS n

Lists all Transformers in the Archive
0 = Internal
1 = USB Key
2 = Actual measurement

DATAEXCHANGEGETDATAS n.guid,table

Guid of internal transformer
Table "Profiles", "WindingSystem", "SetupTaps", "VectorGroups", "VGRelaisConfs", "TrafoCheck", "WRHeader", "TRHeader", "WRResults", "TRResults", "WSPhase"