



acontis technologies GmbH

# **EC-EAP**

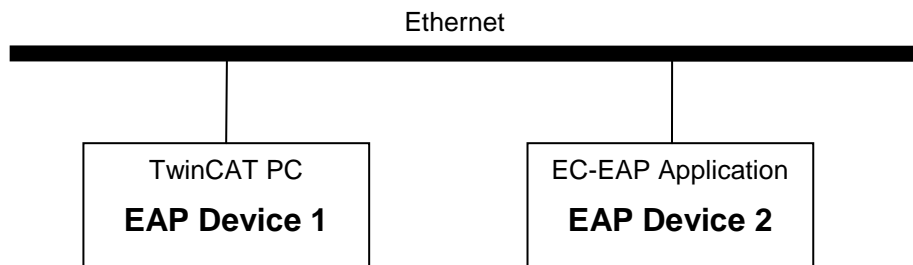
**EtherCAT® Automation Protocol Stack**

**Version 0.8.1**

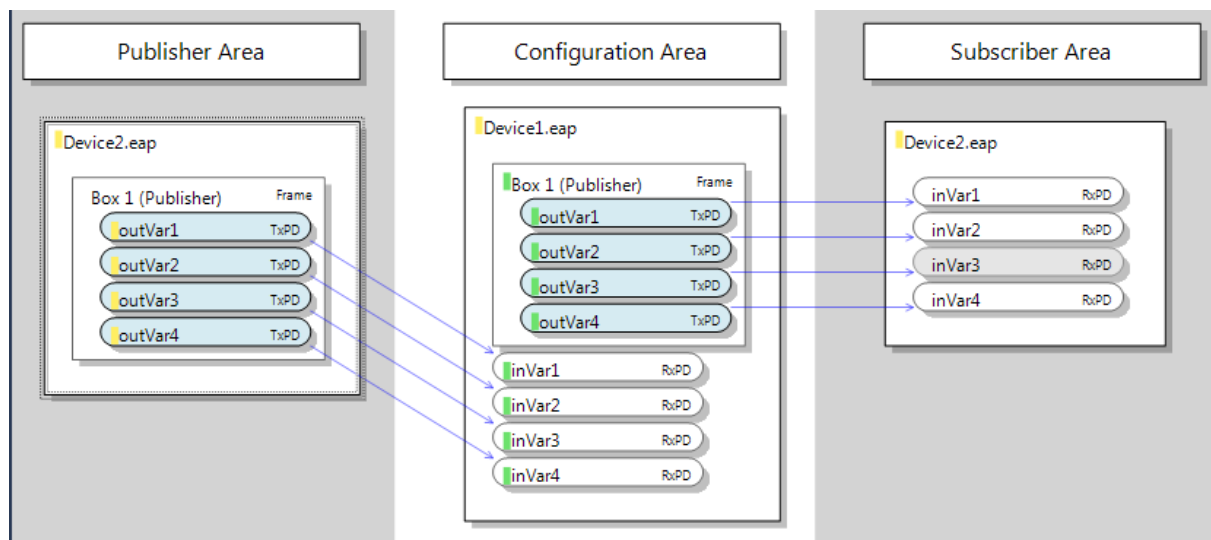
# **Quick Start Guide**

# 1 Demo overview

The demo shows a use case of data communication between a TwinCAT PC (EAP “Device 1”) and as application built with EC-EAP Stack.



The TwinCAT project contains some input and output variables of different types. They will be sent resp. received as process data over EAP.



The logic is straightforward: The EAP variables **outVar1** to **outVar4** (of type WORD, 16 Bits) are incremented each cycle (see *Main*), in the same time the input variables **inVar1** to **inVar4** (of type WORD, 16 Bits) will be incremented on the EC-EAP application side and can be watched online in TwinCAT project.

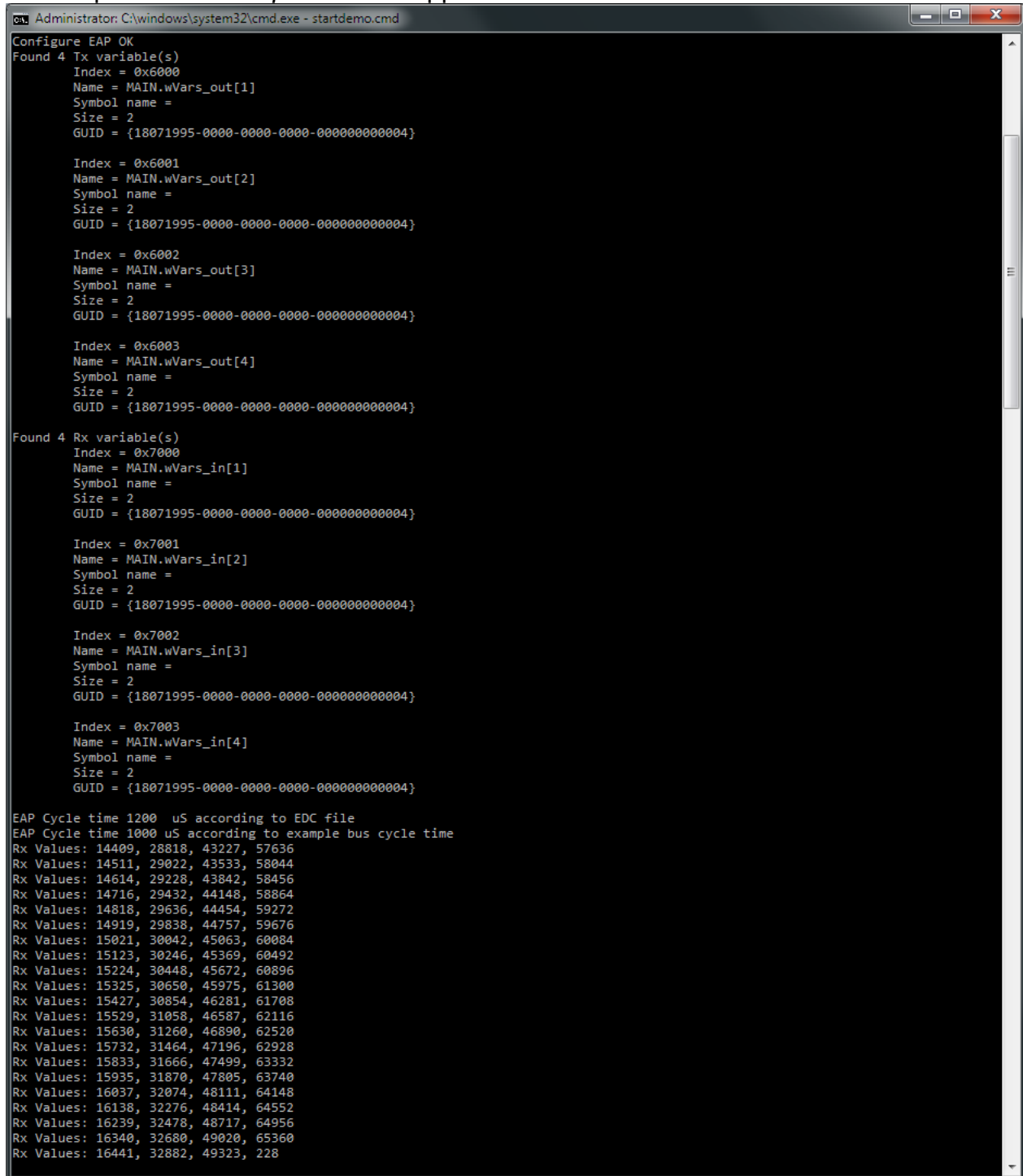
## 2 How to run the demo

1. Unpack and load TwinCAT project “**EAP Test1**”, it located in the “TwinCAT Demo Project” folder.
2. Build the TwinCAT solution and run main program.
3. Load the EAP configuration into Device 1 (TwinCAT).
4. Export the EAP configuration of Device 2 into an EDC file; copy it into a known and accessible folder to be used with the “**EcEapDemo**” project. Alternatively a file *EDC\_Device2.xml* from *Examples\EcEapDemo* can be taken.
5. Optional. Open and build the “**EcEapDemo**” project.
6. Set up and run `.\Bin\Windows\EcEapDemoStart.cmd`, the following parameters has to be changed
  - “- f <EDC file with full path>”, configuration file, in our case *EDC\_Device2.xml* from the *Examples\EcEapDemo* folder
  - “-log eap”, the logfile prefix
  - “-winpcap XXX.XXX.XXX.XXX 1”, XXX.XXX.XXX.XXX is the IP-address of the Ethernet interface used. Note: a link layer DLL *emllPcap.dll* needed.
  - “-ip XXX.XXX.XXX.XXX”, XXX.XXX.XXX.XXX is the IP-address of the EAP stack, needed for UDP protocol.

Other parameters are optional, use them according application needs.

### 3 Demo output

The output of the *EcEapDemo.exe* application can be watched in command window:



```

Administrator: C:\windows\system32\cmd.exe - startdemo.cmd
Configure EAP OK
Found 4 Tx variable(s)
  Index = 0x6000
  Name = MAIN.wVars_out[1]
  Symbol name =
  Size = 2
  GUID = {18071995-0000-0000-0000-000000000004}

  Index = 0x6001
  Name = MAIN.wVars_out[2]
  Symbol name =
  Size = 2
  GUID = {18071995-0000-0000-0000-000000000004}

  Index = 0x6002
  Name = MAIN.wVars_out[3]
  Symbol name =
  Size = 2
  GUID = {18071995-0000-0000-0000-000000000004}

  Index = 0x6003
  Name = MAIN.wVars_out[4]
  Symbol name =
  Size = 2
  GUID = {18071995-0000-0000-0000-000000000004}

Found 4 Rx variable(s)
  Index = 0x7000
  Name = MAIN.wVars_in[1]
  Symbol name =
  Size = 2
  GUID = {18071995-0000-0000-0000-000000000004}

  Index = 0x7001
  Name = MAIN.wVars_in[2]
  Symbol name =
  Size = 2
  GUID = {18071995-0000-0000-0000-000000000004}

  Index = 0x7002
  Name = MAIN.wVars_in[3]
  Symbol name =
  Size = 2
  GUID = {18071995-0000-0000-0000-000000000004}

  Index = 0x7003
  Name = MAIN.wVars_in[4]
  Symbol name =
  Size = 2
  GUID = {18071995-0000-0000-0000-000000000004}

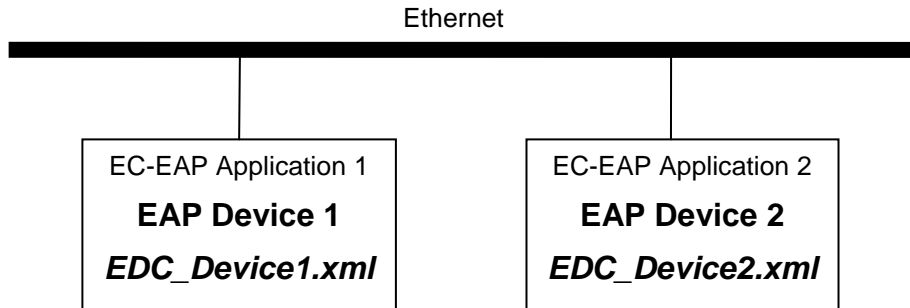
EAP Cycle time 1200 uS according to EDC file
EAP Cycle time 1000 uS according to example bus cycle time
Rx Values: 14409, 28818, 43227, 57636
Rx Values: 14511, 29022, 43533, 58044
Rx Values: 14614, 29228, 43842, 58456
Rx Values: 14716, 29432, 44148, 58864
Rx Values: 14818, 29636, 44454, 59272
Rx Values: 14919, 29838, 44757, 59676
Rx Values: 15021, 30042, 45063, 60084
Rx Values: 15123, 30246, 45369, 60492
Rx Values: 15224, 30448, 45672, 60896
Rx Values: 15325, 30650, 45975, 61300
Rx Values: 15427, 30854, 46281, 61708
Rx Values: 15529, 31058, 46587, 62116
Rx Values: 15630, 31260, 46890, 62520
Rx Values: 15732, 31464, 47196, 62928
Rx Values: 15833, 31666, 47499, 63332
Rx Values: 15935, 31870, 47805, 63740
Rx Values: 16037, 32074, 48111, 64148
Rx Values: 16138, 32276, 48414, 64552
Rx Values: 16239, 32478, 48717, 64956
Rx Values: 16340, 32680, 49020, 65360
Rx Values: 16441, 32882, 49323, 228
  
```

The variables can be watched in TwinCAT as well:

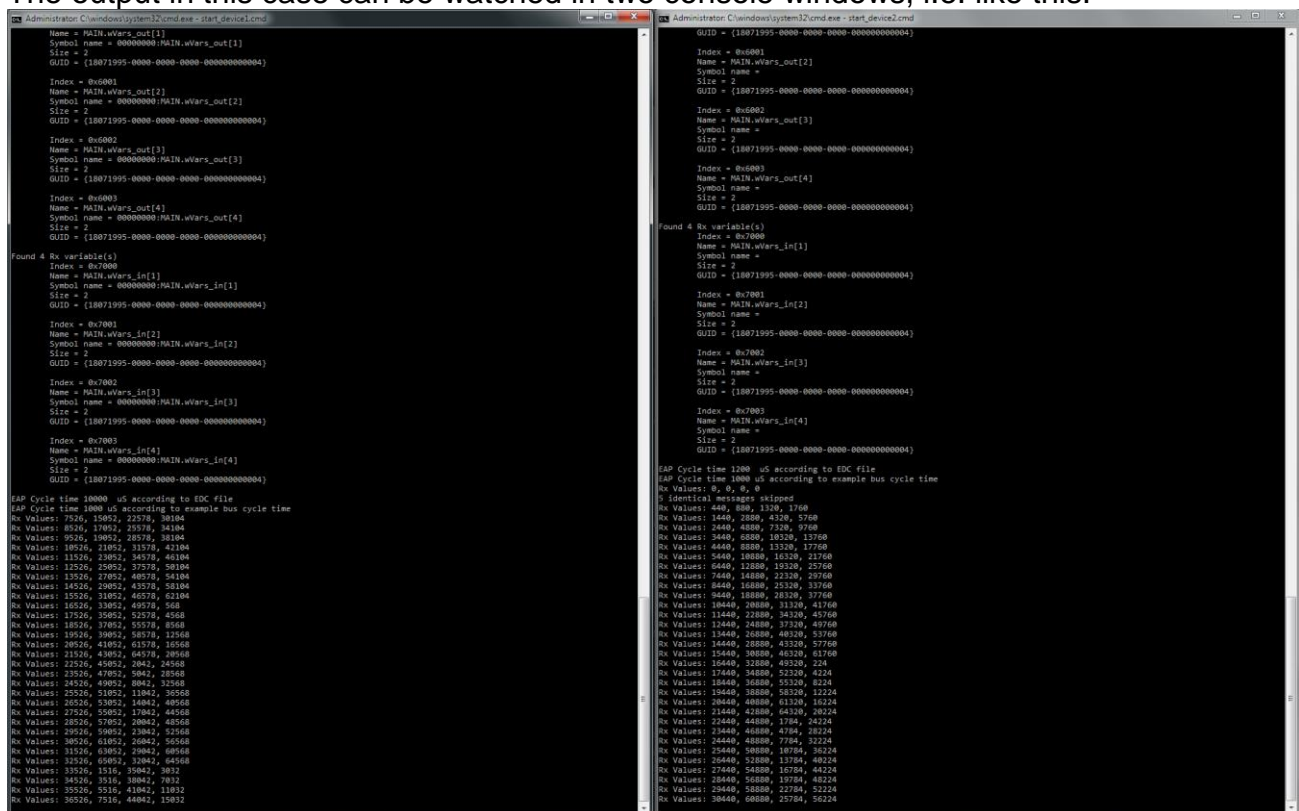


## 4 Run demo with two EC-EAP Stacks

This demo is possible to run with two *EcEapDemo.exe* as well. In order to perform it, it is necessary to pass the Device1 EDC file to a copy of *EcEapDemo.exe*. The corresponding EDC files (*EDC\_Device1.xml* and *EDC\_Device2.xml*) can be found in the *Examples\EcEapDemo* folder.



The output in this case can be watched in two console windows, i.e. like this:



```

Administrator: C:\windows\system32\cmd.exe - start_device1.cmd
Name = MAIN.wvars_out[1]
Symbol name = 00000000:MAIN.wvars_out[1]
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x0001
Name = MAIN.wvars_out[2]
Symbol name = 00000000:MAIN.wvars_out[2]
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x0002
Name = MAIN.wvars_out[3]
Symbol name = 00000000:MAIN.wvars_out[3]
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x0003
Name = MAIN.wvars_out[4]
Symbol name = 00000000:MAIN.wvars_out[4]
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Found 4 Rx variable(s)
Index = 0x7000
Name = MAIN.wvars_in[1]
Symbol name = 00000000:MAIN.wvars_in[1]
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x7001
Name = MAIN.wvars_in[2]
Symbol name = 00000000:MAIN.wvars_in[2]
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x7002
Name = MAIN.wvars_in[3]
Symbol name = 00000000:MAIN.wvars_in[3]
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x7003
Name = MAIN.wvars_in[4]
Symbol name = 00000000:MAIN.wvars_in[4]
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

EAP Cycle time 10000 uS according to EDC file
EAP Cycle time 1000 uS according to example bus cycle time
Rx Values: 7526, 15052, 22578, 30104
Rx Values: 6726, 17052, 23578, 34104
Rx Values: 9526, 19052, 28578, 38104
Rx Values: 18526, 21052, 31578, 42104
Rx Values: 13526, 23052, 34578, 45104
Rx Values: 12526, 25052, 37578, 50104
Rx Values: 13526, 27052, 40578, 51104
Rx Values: 14526, 28052, 43578, 52104
Rx Values: 15526, 31052, 46578, 62104
Rx Values: 16526, 33052, 49578, 56104
Rx Values: 17526, 35052, 52578, 45568
Rx Values: 18526, 37052, 55578, 20568
Rx Values: 19526, 38052, 58578, 12568
Rx Values: 20526, 41052, 61578, 16568
Rx Values: 21526, 43052, 64578, 26568
Rx Values: 22526, 45052, 2942, 24568
Rx Values: 23526, 47052, 3842, 28568
Rx Values: 24526, 49052, 4042, 32568
Rx Values: 25526, 51052, 11042, 36568
Rx Values: 26526, 53052, 14042, 40568
Rx Values: 27526, 55052, 17042, 44568
Rx Values: 28526, 57052, 20042, 48568
Rx Values: 29526, 59052, 23042, 52568
Rx Values: 30526, 61052, 26042, 56568
Rx Values: 31526, 63052, 29042, 60568
Rx Values: 32526, 65052, 32042, 64568
Rx Values: 33526, 1516, 39042, 3052
Rx Values: 34526, 3516, 38042, 7032
Rx Values: 35526, 5516, 41042, 11032
Rx Values: 36526, 7516, 44042, 15032

Administrator: C:\windows\system32\cmd.exe - start_device2.cmd
GUID = {18071995-0000-0000-0000-000000000004}
Index = 0x0001
Name = MAIN.wvars_out[2]
Symbol name =
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x0002
Name = MAIN.wvars_out[3]
Symbol name =
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x0003
Name = MAIN.wvars_out[4]
Symbol name =
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Found 4 Rx variable(s)
Index = 0x7000
Name = MAIN.wvars_in[1]
Symbol name =
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x7001
Name = MAIN.wvars_in[2]
Symbol name =
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x7002
Name = MAIN.wvars_in[3]
Symbol name =
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

Index = 0x7003
Name = MAIN.wvars_in[4]
Symbol name =
Size = 2
GUID = {18071995-0000-0000-0000-000000000004}

EAP Cycle time 12000 uS according to EDC file
EAP Cycle time 1000 uS according to example bus cycle time
Rx Values: 0, 0, 0, 0
0 identical messages skipped
Rx Values: 440, 880, 1320, 1760
Rx Values: 1440, 2880, 4320, 5760
Rx Values: 2440, 4880, 7320, 9760
Rx Values: 3440, 6880, 10320, 13760
Rx Values: 4440, 8880, 13320, 17760
Rx Values: 5440, 10880, 16320, 21760
Rx Values: 6440, 12880, 19320, 25760
Rx Values: 7440, 14880, 22320, 29760
Rx Values: 8440, 16880, 25320, 33760
Rx Values: 9440, 18880, 28320, 37760
Rx Values: 10440, 20880, 31320, 41760
Rx Values: 11440, 22880, 34320, 45760
Rx Values: 12440, 24880, 37320, 49760
Rx Values: 13440, 26880, 40320, 53760
Rx Values: 14440, 28880, 43320, 57760
Rx Values: 15440, 30880, 46320, 61760
Rx Values: 16440, 32880, 49320, 65760
Rx Values: 17440, 34880, 52320, 69760
Rx Values: 18440, 36880, 55320, 73760
Rx Values: 19440, 38880, 58320, 77760
Rx Values: 20440, 40880, 61320, 81760
Rx Values: 21440, 42880, 64320, 85760
Rx Values: 22440, 44880, 67320, 89760
Rx Values: 23440, 46880, 70320, 93760
Rx Values: 24440, 48880, 73320, 97760
Rx Values: 25440, 50880, 76320, 101760
Rx Values: 26440, 52880, 79320, 105760
Rx Values: 27440, 54880, 82320, 109760
Rx Values: 28440, 56880, 85320, 113760
Rx Values: 29440, 58880, 88320, 117760
Rx Values: 30440, 60880, 91320, 121760
Rx Values: 31440, 62880, 94320, 125760
Rx Values: 32440, 64880, 97320, 129760
Rx Values: 33440, 66880, 100320, 133760
Rx Values: 34440, 68880, 103320, 137760
Rx Values: 35440, 70880, 106320, 141760
Rx Values: 36440, 72880, 109320, 145760
Rx Values: 37440, 74880, 112320, 149760
Rx Values: 38440, 76880, 115320, 153760
Rx Values: 39440, 78880, 118320, 157760
Rx Values: 40440, 80880, 121320, 161760
Rx Values: 41440, 82880, 124320, 165760
Rx Values: 42440, 84880, 127320, 169760
Rx Values: 43440, 86880, 130320, 173760
Rx Values: 44440, 88880, 133320, 177760
Rx Values: 45440, 90880, 136320, 181760
Rx Values: 46440, 92880, 139320, 185760
Rx Values: 47440, 94880, 142320, 189760
Rx Values: 48440, 96880, 145320, 193760
Rx Values: 49440, 98880, 148320, 197760
Rx Values: 50440, 100880, 151320, 201760
Rx Values: 51440, 102880, 154320, 205760
Rx Values: 52440, 104880, 157320, 209760
Rx Values: 53440, 106880, 160320, 213760
Rx Values: 54440, 108880, 163320, 217760
Rx Values: 55440, 110880, 166320, 221760
Rx Values: 56440, 112880, 169320, 225760
Rx Values: 57440, 114880, 172320, 229760
Rx Values: 58440, 116880, 175320, 233760
Rx Values: 59440, 118880, 178320, 237760
Rx Values: 60440, 120880, 181320, 241760
Rx Values: 61440, 122880, 184320, 245760
Rx Values: 62440, 124880, 187320, 249760
Rx Values: 63440, 126880, 190320, 253760
Rx Values: 64440, 128880, 193320, 257760
Rx Values: 65440, 130880, 196320, 261760
Rx Values: 66440, 132880, 199320, 265760
Rx Values: 67440, 134880, 202320, 269760
Rx Values: 68440, 136880, 205320, 273760
Rx Values: 69440, 138880, 208320, 277760
Rx Values: 70440, 140880, 211320, 281760
Rx Values: 71440, 142880, 214320, 285760
Rx Values: 72440, 144880, 217320, 289760
Rx Values: 73440, 146880, 220320, 293760
Rx Values: 74440, 148880, 223320, 297760
Rx Values: 75440, 150880, 226320, 301760
Rx Values: 76440, 152880, 229320, 305760
Rx Values: 77440, 154880, 232320, 309760
Rx Values: 78440, 156880, 235320, 313760
Rx Values: 79440, 158880, 238320, 317760
Rx Values: 80440, 160880, 241320, 321760
Rx Values: 81440, 162880, 244320, 325760
Rx Values: 82440, 164880, 247320, 329760
Rx Values: 83440, 166880, 250320, 333760
Rx Values: 84440, 168880, 253320, 337760
Rx Values: 85440, 170880, 256320, 341760
Rx Values: 86440, 172880, 259320, 345760
Rx Values: 87440, 174880, 262320, 349760
Rx Values: 88440, 176880, 265320, 353760
Rx Values: 89440, 178880, 268320, 357760
Rx Values: 90440, 180880, 271320, 361760
Rx Values: 91440, 182880, 274320, 365760
Rx Values: 92440, 184880, 277320, 369760
Rx Values: 93440, 186880, 280320, 373760
Rx Values: 94440, 188880, 283320, 377760
Rx Values: 95440, 190880, 286320, 381760
Rx Values: 96440, 192880, 289320, 385760
Rx Values: 97440, 194880, 292320, 389760
Rx Values: 98440, 196880, 295320, 393760
Rx Values: 99440, 198880, 298320, 397760
Rx Values: 100440, 200880, 301320, 401760
Rx Values: 101440, 202880, 304320, 405760
Rx Values: 102440, 204880, 307320, 409760
Rx Values: 103440, 206880, 310320, 413760
Rx Values: 104440, 208880, 313320, 417760
Rx Values: 105440, 210880, 316320, 421760
Rx Values: 106440, 212880, 319320, 425760
Rx Values: 107440, 214880, 322320, 429760
Rx Values: 108440, 216880, 325320, 433760
Rx Values: 109440, 218880, 328320, 437760
Rx Values: 110440, 220880, 331320, 441760
Rx Values: 111440, 222880, 334320, 445760
Rx Values: 112440, 224880, 337320, 449760
Rx Values: 113440, 226880, 340320, 453760
Rx Values: 114440, 228880, 343320, 457760
Rx Values: 115440, 230880, 346320, 461760
Rx Values: 116440, 232880, 349320, 465760
Rx Values: 117440, 234880, 352320, 469760
Rx Values: 118440, 236880, 355320, 473760
Rx Values: 119440, 238880, 358320, 477760
Rx Values: 120440, 240880, 361320, 481760
Rx Values: 121440, 242880, 364320, 485760
Rx Values: 122440, 244880, 367320, 489760
Rx Values: 123440, 246880, 370320, 493760
Rx Values: 124440, 248880, 373320, 497760
Rx Values: 125440, 250880, 376320, 501760
Rx Values: 126440, 252880, 379320, 505760
Rx Values: 127440, 254880, 382320, 509760
Rx Values: 128440, 256880, 385320, 513760
Rx Values: 129440, 258880, 388320, 517760
Rx Values: 130440, 260880, 391320, 521760
Rx Values: 131440, 262880, 394320, 525760
Rx Values: 132440, 264880, 397320, 529760
Rx Values: 133440, 266880, 400320, 533760
Rx Values: 134440, 268880, 403320, 537760
Rx Values: 135440, 270880, 406320, 541760
Rx Values: 136440, 272880, 409320, 545760
Rx Values: 137440, 274880, 412320, 549760
Rx Values: 138440, 276880, 415320, 553760
Rx Values: 139440, 278880, 418320, 557760
Rx Values: 140440, 280880, 421320, 561760
Rx Values: 141440, 282880, 424320, 565760
Rx Values: 142440, 284880, 427320, 569760
Rx Values: 143440, 286880, 430320, 573760
Rx Values: 144440, 288880, 433320, 577760
Rx Values: 145440, 290880, 436320, 581760
Rx Values: 146440, 292880, 439320, 585760
Rx Values: 147440, 294880, 442320, 589760
Rx Values: 148440, 296880, 445320, 593760
Rx Values: 149440, 298880, 448320, 597760
Rx Values: 150440, 300880, 451320, 601760
Rx Values: 151440, 302880, 454320, 605760
Rx Values: 152440, 304880, 457320, 609760
Rx Values: 153440, 306880, 460320, 613760
Rx Values: 154440, 308880, 463320, 617760
Rx Values: 155440, 310880, 466320, 621760
Rx Values: 156440, 312880, 469320, 625760
Rx Values: 157440, 314880, 472320, 629760
Rx Values: 158440, 316880, 475320, 633760
Rx Values: 159440, 318880, 478320, 637760
Rx Values: 160440, 320880, 481320, 641760
Rx Values: 161440, 322880, 484320, 645760
Rx Values: 162440, 324880, 487320, 649760
Rx Values: 163440, 326880, 490320, 653760
Rx Values: 164440, 328880, 493320, 657760
Rx Values: 165440, 330880, 496320, 661760
Rx Values: 166440, 332880, 499320, 665760
Rx Values: 167440, 334880, 502320, 669760
Rx Values: 168440, 336880, 505320, 673760
Rx Values: 169440, 338880, 508320, 677760
Rx Values: 170440, 340880, 511320, 681760
Rx Values: 171440, 342880, 514320, 685760
Rx Values: 172440, 344880, 517320, 689760
Rx Values: 173440, 346880, 520320, 693760
Rx Values: 174440, 348880, 523320, 697760
Rx Values: 175440, 350880, 526320, 701760
Rx Values: 176440, 352880, 529320, 705760
Rx Values: 177440, 354880, 532320, 709760
Rx Values: 178440, 356880, 535320, 713760
Rx Values: 179440, 358880, 538320, 717760
Rx Values: 180440, 360880, 541320, 721760
Rx Values: 181440, 362880, 544320, 725760
Rx Values: 182440, 364880, 547320, 729760
Rx Values: 183440, 366880, 550320, 733760
Rx Values: 184440, 368880, 553320, 737760
Rx Values: 185440, 370880, 556320, 741760
Rx Values: 186440, 372880, 559320, 745760
Rx Values: 187440, 374880, 562320, 749760
Rx Values: 188440, 376880, 565320, 753760
Rx Values: 189440, 378880, 568320, 757760
Rx Values: 190440, 380880, 571320, 761760
Rx Values: 191440, 382880, 574320, 765760
Rx Values: 192440, 384880, 577320, 769760
Rx Values: 193440, 386880, 580320, 773760
Rx Values: 194440, 388880, 583320, 777760
Rx Values: 195440, 390880, 586320, 781760
Rx Values: 196440, 392880, 589320, 785760
Rx Values: 197440, 394880, 592320, 789760
Rx Values: 198440, 396880, 595320, 793760
Rx Values: 199440, 398880, 598320, 797760
Rx Values: 200440, 400880, 601320, 801760
Rx Values: 201440, 402880, 604320, 805760
Rx Values: 202440, 404880, 607320, 809760
Rx Values: 203440, 406880, 610320, 813760
Rx Values: 204440, 408880, 613320, 817760
Rx Values: 205440, 410880, 616320, 821760
Rx Values: 206440, 412880, 619320, 825760
Rx Values: 207440, 414880, 622320, 829760
Rx Values: 208440, 416880, 625320, 833760
Rx Values: 209440, 418880, 628320, 837760
Rx Values: 210440, 420880, 631320, 841760
Rx Values: 211440, 422880, 634320, 845760
Rx Values: 212440, 424880, 637320, 849760
Rx Values: 213440, 426880, 640320, 853760
Rx Values: 214440, 428880, 643320, 857760
Rx Values: 215440, 430880, 646320, 861760
Rx Values: 216440, 432880, 649320, 865760
Rx Values: 217440, 434880, 652320, 869760
Rx Values: 218440, 436880, 655320, 873760
Rx Values: 219440, 438880, 658320, 877760
Rx Values: 220440, 440880, 661320, 881760
Rx Values: 221440, 442880, 664320, 885760
Rx Values: 222440, 444880, 667320, 889760
Rx Values: 223440, 446880, 670320, 893760
Rx Values: 224440, 448880, 673320, 897760
Rx Values: 225440, 450880, 676320, 901760
Rx Values: 226440, 452880, 679320, 905760
Rx Values: 227440, 454880, 682320, 909760
Rx Values: 228440, 456880, 685320, 913760
Rx Values: 229440, 458880, 688320, 917760
Rx Values: 230440, 460880, 691320, 921760
Rx Values: 231440, 462880, 694320, 925760
Rx Values: 232440, 464880, 697320, 929760
Rx Values: 233440, 466880, 700320, 933760
Rx Values: 234440, 468880, 703320, 937760
Rx Values: 235440, 470880, 706320, 941760
Rx Values: 236440, 472880, 709320, 945760
Rx Values: 237440, 474880, 712320, 949760
Rx Values: 238440, 476880, 715320, 953760
Rx Values: 239440, 478880, 718320, 957760
Rx Values: 240440, 480880, 721320, 961760
Rx Values: 241440, 482880, 724320, 965760
Rx Values: 242440, 484880, 727320, 969760
Rx Values: 243440, 486880, 730320, 973760
Rx Values: 244440, 488880, 733320, 977760
Rx Values: 245440, 490880, 736320, 981760
Rx Values: 246440, 492880, 739320, 985760
Rx Values: 247440, 494880, 742320, 989760
Rx Values: 248440, 496880, 745320, 993760
Rx Values: 249440, 498880, 748320, 997760
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Rx Values: 257440, 514880, 772320, 1029760
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Rx Values: 265440, 530880, 796320, 1061760
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Rx Values: 267440, 534880, 802320, 1069760
Rx Values: 268440, 536880, 805320, 1073760
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Rx Values: 274440, 548880, 823320, 1097760
Rx Values: 275440, 5508
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