



BLONDER TONGUE
L A B O R A T O R I E S

IPTV Troubleshooting Tools

**CMD Line – Wireshark – TS Reader Lite
MTSA-PRO – VLC Media Player**

IP Troubleshooting Tools



- CMD (Command) Line
 - On all Laptops/computers
 - Good first tool for verifying Network connectivity
- Wireshark (IP Stream Analyzer) – FREEWARE
 - Can capture/record IP streams, send them for evaluation
 - Powerful tool with many filters and settings
- TSReader Pro / Lite (RF/ASI/IP Transport Stream Analyzer)
 - For RF and ASI, requires additional hardware
 - Pro – pay version; Lite – limited free version
- MTSA-PRO (RF/ASI/IP – Transport Stream Analyzer)
 - Good for evaluating the TS once all transport issues have been resolved, if there are still issues
 - MTSA-PRO hardware required to be connected, for software key to work

CMD Commands - IPCONFIG

- Command Line troubleshooting is the basic (first line) troubleshooting for IT networks
- START>RUN, CMD (Windows XP); START, CMD in search box (Windows 7); CMD in search box (Windows 10) opens the command line box
- IPCONFIG command tells us about our computer
- IPCONFIG / ALL tells us more info about our computer

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\wwaite>ipconfig

Windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    IP Address. . . . . : 172.16.70.100
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

C:\Documents and Settings\wwaite>
```

```
C:\WINDOWS\system32\cmd.exe

C:\Documents and Settings\wwaite>ipconfig /all

Windows IP Configuration

    Host Name . . . . . : heggelap
    Primary Dns Suffix . . . . . : blondertongue.com
    Node Type . . . . . : Hybrid
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 
    Description . . . . . : Broadcom 440x 10/100 Integrated Cont
roller
    Physical Address. . . . . : 00-1D-09-C2-7A-32
    Dhcp Enabled. . . . . : No
    IP Address. . . . . : 172.16.70.100
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

C:\Documents and Settings\wwaite>
```

Packet Internet Groper (PING)

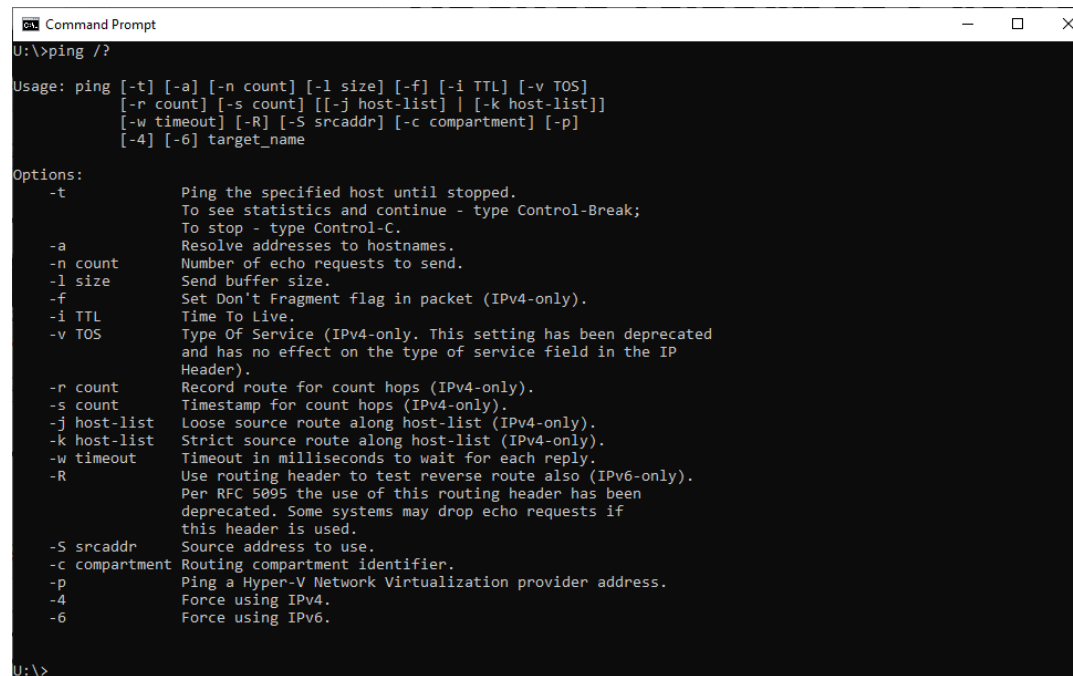
- PING command tells us if we can reach intended target
- PING 1 is with crossover cable direct to HDE-CHV-QAM
- PING 2 is via wireless card to Google.com
 - Also tells us DNS is working
- 'ping 127.0.0.1' is loop back of your LAN card
- Remember to PING the Actual address of equipment, not the Streaming Destination IP Address

```
C:\WINDOWS\system32\cmd.exe
C:\Documents and Settings\wwaite>ping 172.16.70.1
Pinging 172.16.70.1 with 32 bytes of data:
Reply from 172.16.70.1: bytes=32 time=1ms TTL=64
Reply from 172.16.70.1: bytes=32 time<1ms TTL=64
Reply from 172.16.70.1: bytes=32 time<1ms TTL=64
Reply from 172.16.70.1: bytes=32 time<1ms TTL=64
Ping statistics for 172.16.70.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\Documents and Settings\wwaite>
```

```
C:\WINDOWS\system32\cmd.exe
C:\Documents and Settings\wwaite>ping google.com
Pinging google.com [74.125.226.3] with 32 bytes of data:
Reply from 74.125.226.3: bytes=32 time=9ms TTL=54
Reply from 74.125.226.3: bytes=32 time=7ms TTL=54
Reply from 74.125.226.3: bytes=32 time=9ms TTL=54
Reply from 74.125.226.3: bytes=32 time=8ms TTL=54
Ping statistics for 74.125.226.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 7ms, Maximum = 9ms, Average = 8ms
C:\Documents and Settings\wwaite>
```

Packet Internet Groper (PING Options)

- PING options
 - "-t" - indefinite ping - until user stops
 - "-n {count}" - specify number of pings to send (default = 4)
 - "-l {size}" - specify size of ping packets. Max 65,527; default 32



```
U:\>ping /?

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
          [-r count] [-s count] [[-j host-list] | [-k host-list]]
          [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
          [-4] [-6] target_name

Options:
  -t          Ping the specified host until stopped.
               To see statistics and continue - type Control-Break;
               To stop - type Control-C.
  -a          Resolve addresses to hostnames.
  -n count    Number of echo requests to send.
  -l size     Send buffer size.
  -f          Set Don't Fragment flag in packet (IPv4-only).
  -i TTL      Time To Live.
  -v TOS      Type Of Service (IPv4-only. This setting has been deprecated
               and has no effect on the type of service field in the IP
               Header).
  -r count    Record route for count hops (IPv4-only).
  -s count    Timestamp for count hops (IPv4-only).
  -j host-list Loose source route along host-list (IPv4-only).
  -k host-list Strict source route along host-list (IPv4-only).
  -w timeout  Timeout in milliseconds to wait for each reply.
  -R          Use routing header to test reverse route also (IPv6-only).
               Per RFC 5095 the use of this routing header has been
               deprecated. Some systems may drop echo requests if
               this header is used.
  -S srcaddr  Source address to use.
  -c compartment Routing compartment identifier.
  -p          Ping a Hyper-V Network Virtualization provider address.
  -4          Force using IPv4.
  -6          Force using IPv6.
```

Trace Route (TRACERT)

- Can enter IP Address or host name of destination
- Typing only 'tracert' gives a list of options available
- Each "hop" is queried 3x, ping times listed
- Must put ACTUAL IP address of encoder, not streaming IP address

```
C:\WINDOWS\system32\cmd.exe

C:\Documents and Settings\wwaite>tracert google.com

Tracing route to google.com [74.125.226.3]
over a maximum of 30 hops:

  1      5 ms      1 ms      1 ms      172.16.41.5
  2      3 ms      2 ms      2 ms      41335bc1.cst.lightpath.net [65.51.91.193]
  3     12 ms      6 ms     11 ms     adfb6231.cst.lightpath.net [173.251.98.49]
  4     41 ms      5 ms      6 ms     hunt183-93.optonline.net [167.206.183.93]
  5      7 ms      7 ms      6 ms     189d3a01.cst.lightpath.net [24.157.58.1]
  6      9 ms      9 ms      8 ms     451be0b9.cst.lightpath.net [65.19.113.185]
  7      9 ms      7 ms      7 ms     72.14.215.203
  8     23 ms      7 ms      7 ms     209.85.247.29
  9      9 ms      7 ms      7 ms     209.85.245.177
 10      7 ms      7 ms      9 ms     lga15s42-in-f3.1e100.net [74.125.226.3]

Trace complete.

C:\Documents and Settings\wwaite>_
```

Tracert

- Asterisks on ping columns indicates time out
- 3x time out, tracert will look for another path

```
C:\Windows\system32\cmd.exe
C:\Users\wwaite>tracert yahoo.com

Tracing route to yahoo.com [98.138.253.109]
over a maximum of 30 hops:

  1    11 ms    <1 ms    <1 ms    172.16.130.5
  2     2 ms     1 ms     1 ms    41335bc1.cst.lightpath.net [65.51.91.193]
  3     5 ms     5 ms     5 ms    adfb6231.cst.lightpath.net [173.251.98.49]
  4     5 ms     5 ms     5 ms    hunt183-93.optonline.net [167.206.183.93]
  5     6 ms     6 ms     6 ms    189d3a01.cst.lightpath.net [24.157.58.1]
  6     7 ms     7 ms     7 ms    451be0b9.cst.lightpath.net [65.19.113.185]
  7     8 ms     9 ms     8 ms    64.15.0.43
  8     8 ms     8 ms     7 ms    451be0da.cst.lightpath.net [65.19.120.218]
  9    14 ms    14 ms    14 ms    rtr7-ge2-1.in.nycmnyzr.cv.net [64.15.0.106]
 10    *        *        *        Request timed out.
 11    13 ms    13 ms    13 ms    ae-6.pat1.dce.yahoo.com [216.115.102.172]
 12    30 ms    36 ms    35 ms    ae-6.pat1.che.yahoo.com [216.115.96.81]
 13    47 ms    47 ms    47 ms    ae-7.pat2.nez.yahoo.com [216.115.104.126]
 14    53 ms    51 ms    53 ms    ae-0.msr2.ne1.yahoo.com [216.115.100.3]
 15    65 ms    54 ms    52 ms    ae-1.clr1-a-gdc.ne1.yahoo.com [98.138.144.29]
 16    52 ms    53 ms    53 ms    et-18-25.fab1-1-gdc.ne1.yahoo.com [98.138.0.91]

 17    56 ms    56 ms    63 ms    po-11.bas1-7-prd.ne1.yahoo.com [98.138.240.8]
 18    53 ms    52 ms    55 ms    ir1.fp.vip.ne1.yahoo.com [98.138.253.109]

Trace complete.
C:\Users\wwaite>_
```

Tracert Options

- Tracert Options
 - "-d" may speed up tracert
 - "-h" defines max hops
 - "-w" wait timeout – default 4000 ms (4 sec)

```
U:\>tracert /?

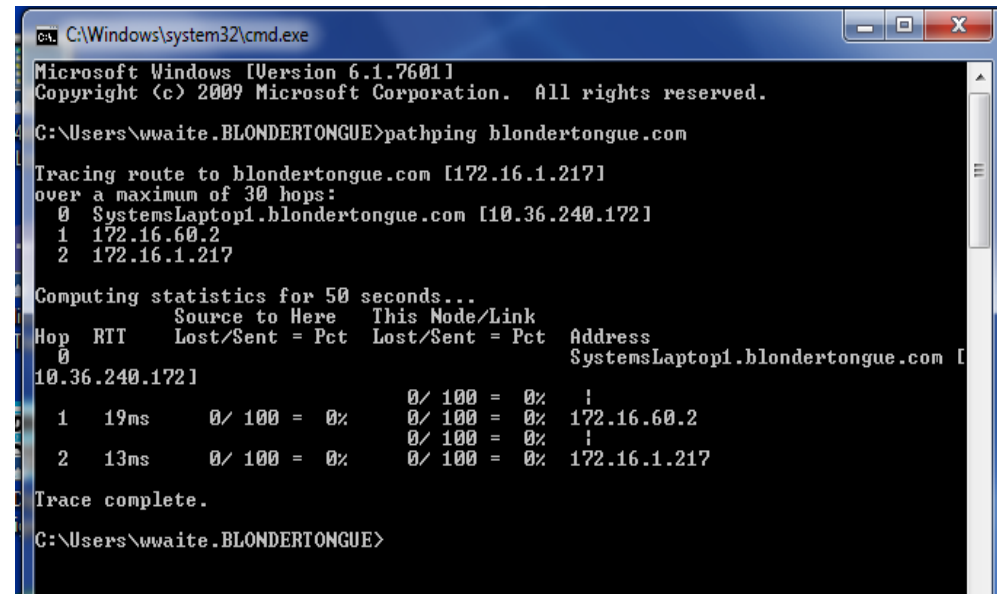
Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
              [-R] [-S srcaddr] [-4] [-6] target_name

Options:
  -d                Do not resolve addresses to hostnames.
  -h maximum_hops   Maximum number of hops to search for target.
  -j host-list       Loose source route along host-list (IPv4-only).
  -w timeout         Wait timeout milliseconds for each reply.
  -R                Trace round-trip path (IPv6-only).
  -S srcaddr         Source address to use (IPv6-only).
  -4                Force using IPv4.
  -6                Force using IPv6.

U:\>_
```


Path Ping (PATHPING)

- Combination of PING and TRACERT commands
- Can take a few minutes to perform
 - PINGs every hop from source to destination 100x (default)
 - Records and displays results
 - Can help us determine if there is a problem on the network



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\wwaite.BLONDERTONGUE>pathping blondertongue.com

Tracing route to blondertongue.com [172.16.1.217]
over a maximum of 30 hops:
 0  SystemsLaptop1.blondertongue.com [10.36.240.172]
 1  172.16.60.2
 2  172.16.1.217

Computing statistics for 50 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
 0                               Lost/Sent = Pct  Lost/Sent = Pct
 0                               0/ 100 = 0%      0/ 100 = 0%      SystemsLaptop1.blondertongue.com [
10.36.240.172]
 1   19ms     0/ 100 = 0%      0/ 100 = 0%      172.16.60.2
 2   13ms     0/ 100 = 0%      0/ 100 = 0%      172.16.1.217

Trace complete.

C:\Users\wwaite.BLONDERTONGUE>
```

Path Ping (PATHPING)

- PATHPING to Google.com from Blonder Tongue
- Note 100% loss between hop 5 and 6 – then found a different path
- Note higher RTT (route trace time) times deeper in the network
- 100% loss on hop 6 – may not allow PINGs

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\wwaite.BLONDERTONGUE>pathping google.com

Tracing route to google.com [172.217.10.46]
over a maximum of 30 hops:
 0  SystemsLaptop1.blondertongue.com [10.36.240.172]
 1  172.16.60.2
 2  172.16.100.1
 3  413329a1.cst.lightpath.net [65.51.41.161]
 4  64.15.3.148
 5  451be0c6.cst.lightpath.net [65.19.120.198]
 6  72.14.215.203
 7  * * *
Computing statistics for 150 seconds...
Hop  RTT      Source to Here          This Node/Link          Address
     Lost/Sent = Pct      Lost/Sent = Pct
 0      0/ 100 = 0%           0/ 100 = 0%           SystemsLaptop1.blondertongue.com [10.36.240.172]
 1    3ms      0/ 100 = 0%           0/ 100 = 0%           172.16.60.2
 2    3ms      0/ 100 = 0%           0/ 100 = 0%           172.16.100.1
 3    3ms      0/ 100 = 0%           0/ 100 = 0%           413329a1.cst.lightpath.net [65.51.41.161]
 4    6ms      0/ 100 = 0%           0/ 100 = 0%           64.15.3.148
 5    8ms      0/ 100 = 0%           0/ 100 = 0%           451be0c6.cst.lightpath.net [65.19.120.198]
 6    ---    100/ 100 =100%        0/ 100 = 0%           72.14.215.203

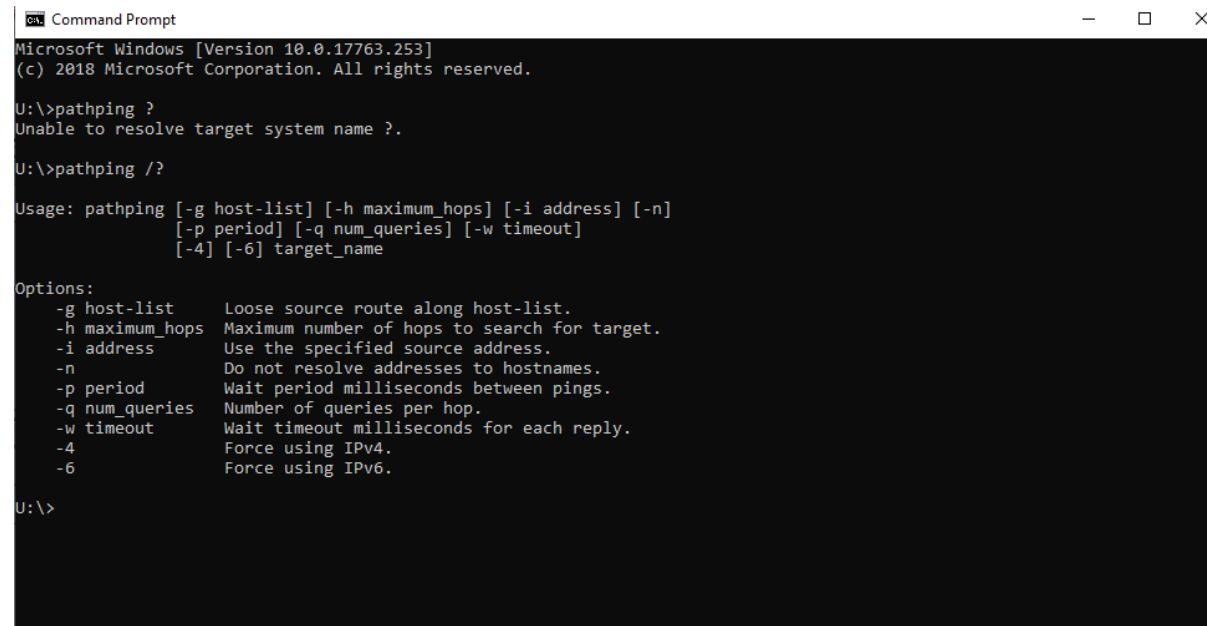
Trace complete.

C:\Users\wwaite.BLONDERTONGUE>
```

Path Ping (PATHPING) Options

■ PATHPING options list

- "-n" option may speed up process – does not DNS resolve all addresses
- "-p" default 250 ms
- "-q" default 100
- "-w" default 3000 ms (3 sec)



```
Command Prompt
Microsoft Windows [Version 10.0.17763.253]
(c) 2018 Microsoft Corporation. All rights reserved.

U:\>pathping ?
Unable to resolve target system name ?.

U:\>pathping /?

Usage: pathping [-g host-list] [-h maximum_hops] [-i address] [-n]
               [-p period] [-q num_queries] [-w timeout]
               [-4] [-6] target_name

Options:
  -g host-list    Loose source route along host-list.
  -h maximum_hops Maximum number of hops to search for target.
  -i address      Use the specified source address.
  -n             Do not resolve addresses to hostnames.
  -p period       Wait period milliseconds between pings.
  -q num_queries  Number of queries per hop.
  -w timeout      Wait timeout milliseconds for each reply.
  -4             Force using IPv4.
  -6             Force using IPv6.

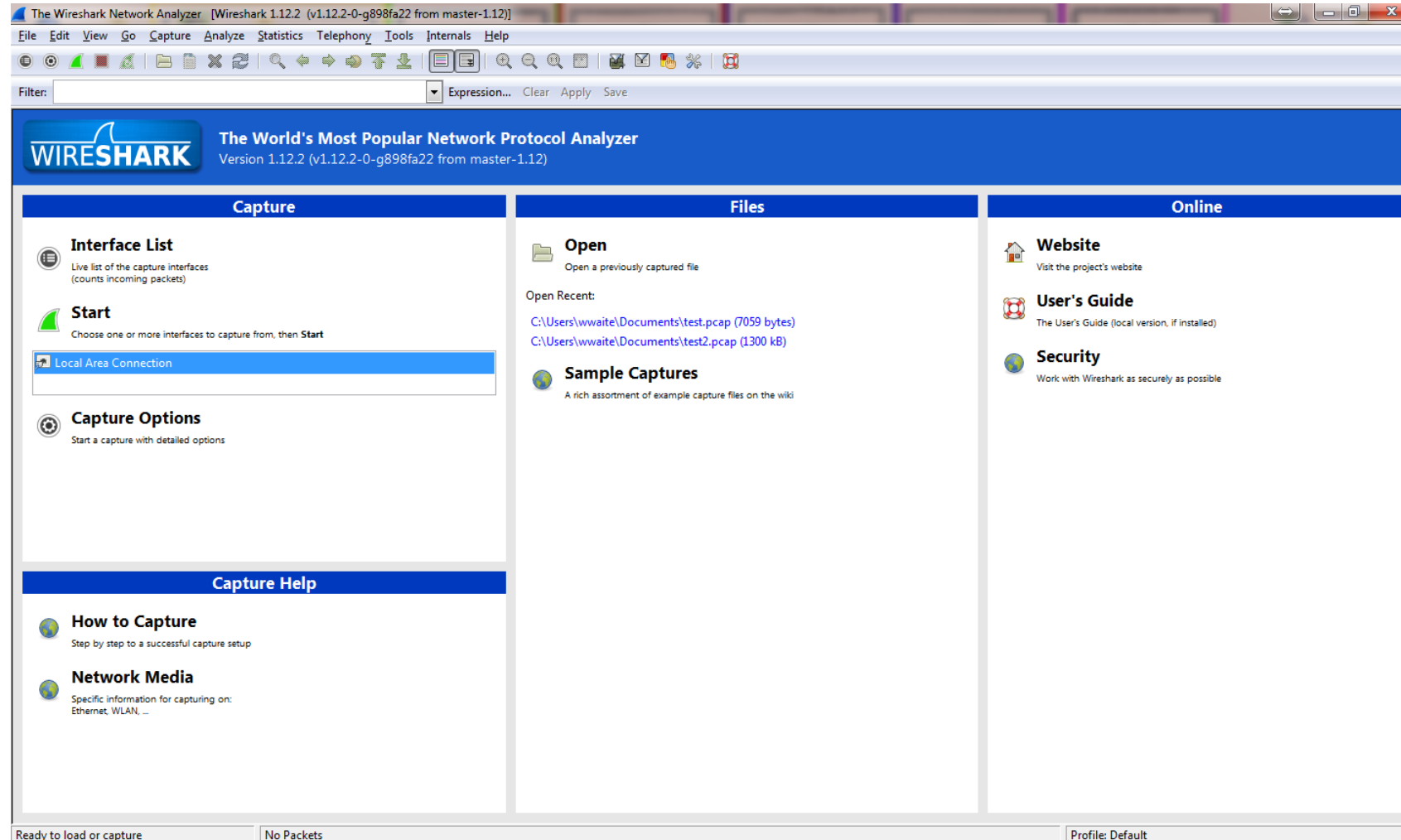
U:\>
```

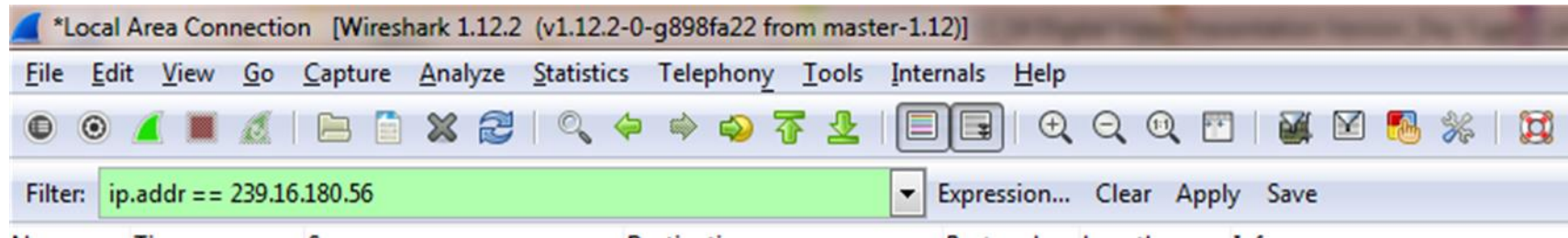


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WIRESHARK







- Set up a Capture Filter prior to capturing data
 - Will Only display/save packets passed by filter
 - Cannot go back and see other packets
 - Smaller file size
 - NOT recommend to set up Capture Filter when sending an evaluation file to engineers, unless specified

WIRESHARK Filter Syntax



- Most common filters when evaluating IP Video traffic
 - ip.addr [specific source or destination IP address]
 - ip.dst [specific IP address of destination]
 - ip.src [specific IP address of source]
 - udp.port [specific source or destination port]
 - udp.dstport [specific destination port]
 - Udp.srcport [specific source port]
- Example:
 - ip.addr == 172.16.70.1

- Operators in filter stream
 - 'eq' or '==' [is equal to]
 - 'ne' or '!=' [is NOT equal to]
 - 'gt' or '>' [greater than]
 - 'lt' or '<' [less than]
 - 'ge' or '>=' [greater than or equal to]
 - 'le' or '<=' [less than or equal to]
- Example:
 - ip.addr eq 172.16.70.1
 - ip.dst eq 225.10.10.10

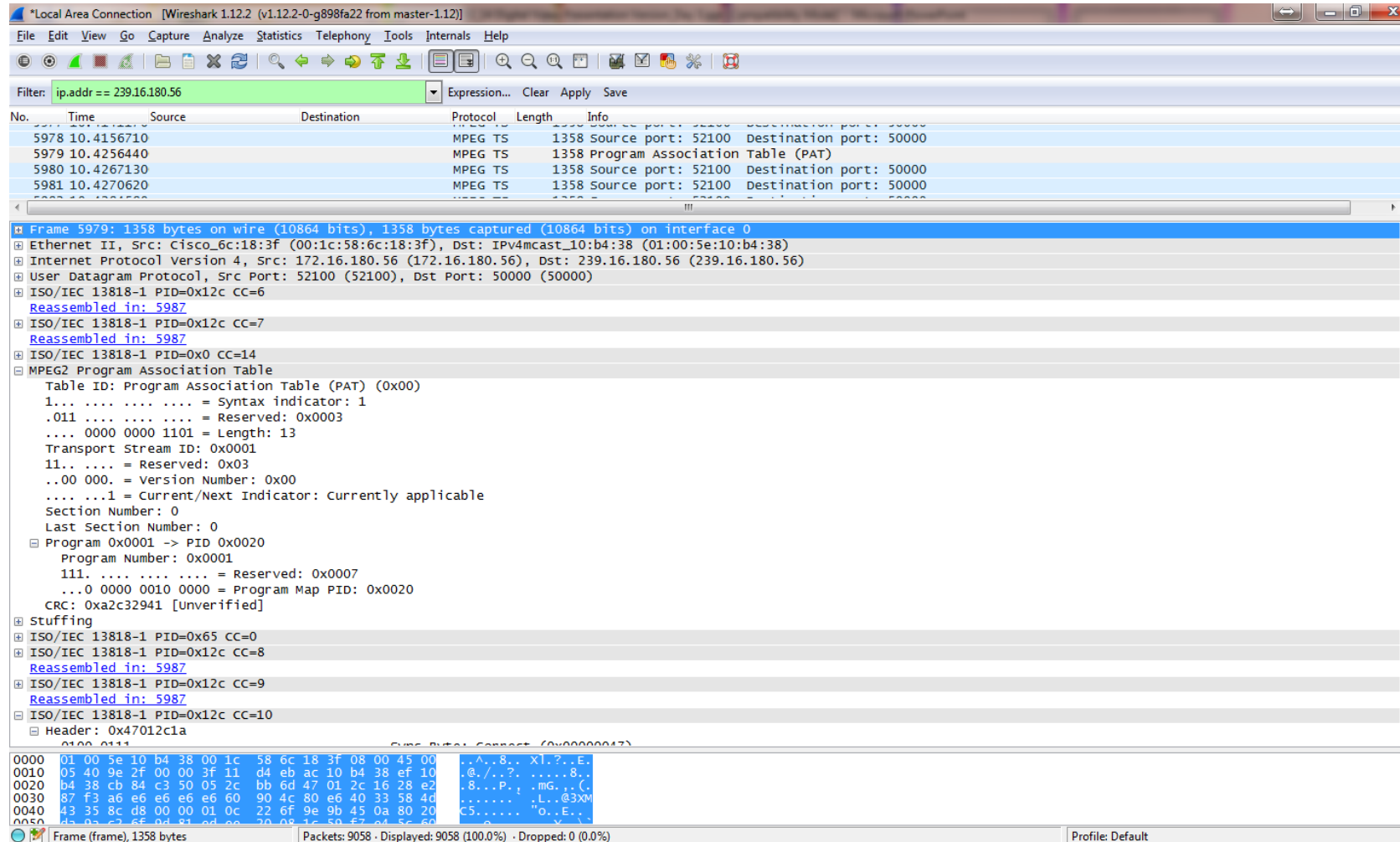
WIRESHARK Filter Syntax



- Multiple filter strings can be put together
- Logic in filter strings
 - 'and' or '&&' [both strings are true]
 - 'or' or '||' [at least one string is true]
 - 'xor' or '^' [one or the other is true but not both]
 - 'not' or '!' [to make string not true]
- Example:
 - `ip.addr == 172.16.70.1 xor ip.addr == 239.25.25.25`
 - `ip.addr == 172.16.70.20 and udp.oirt == 5000`

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PAT Details



Wireshark 1.12.2 (v1.12.2-0-g898fa22 from master-1.12) - Local Area Connection

Filter: `ip.addr == 239.16.180.56` Expression... Clear Apply Save

No.	Time	Source	Destination	Protocol	Length	Info
5978	10.4156710			MPEG TS	1358	Source port: 52100 Destination port: 50000
5979	10.4256440			MPEG TS	1358	Program Association Table (PAT)
5980	10.4267130			MPEG TS	1358	Source port: 52100 Destination port: 50000
5981	10.4270620			MPEG TS	1358	Source port: 52100 Destination port: 50000

Frame 5979: 1358 bytes on wire (10864 bits), 1358 bytes captured (10864 bits) on interface 0

- Ethernet II, Src: Cisco_6c:18:3f (00:1c:58:6c:18:3f), Dst: IPv4mcast_10:b4:38 (01:00:5e:10:b4:38)
- Internet Protocol Version 4, Src: 172.16.180.56 (172.16.180.56), Dst: 239.16.180.56 (239.16.180.56)
- User Datagram Protocol, Src Port: 52100 (52100), Dst Port: 50000 (50000)
- ISO/IEC 13818-1 PID=0x12c CC=6
 - Reassembled in: 5987
- ISO/IEC 13818-1 PID=0x12c CC=7
 - Reassembled in: 5987
- ISO/IEC 13818-1 PID=0x0 CC=14
- MPEG2 Program Association Table
 - Table ID: Program Association Table (PAT) (0x00)
 - 1... .. = Syntax indicator: 1
 - .011 = Reserved: 0x0003
 - ... 0000 0000 1101 = Length: 13
 - Transport Stream ID: 0x0001
 - 11... .. = Reserved: 0x03
 - ..00 000. = Version Number: 0x00
 -1 = Current/Next Indicator: Currently applicable
 - Section Number: 0
 - Last Section Number: 0
 - Program 0x0001 -> PID 0x0020
 - Program Number: 0x0001
 - 111. = Reserved: 0x0007
 - ...0 0000 0010 0000 = Program Map PID: 0x0020
 - CRC: 0xa2c32941 [Unverified]
- Stuffing
- ISO/IEC 13818-1 PID=0x65 CC=0
- ISO/IEC 13818-1 PID=0x12c CC=8
 - Reassembled in: 5987
- ISO/IEC 13818-1 PID=0x12c CC=9
 - Reassembled in: 5987
- ISO/IEC 13818-1 PID=0x12c CC=10
 - Header: 0x47012c1a

0000 01 00 5e 10 b4 38 00 1c 58 6c 18 3f 08 00 45 00 ..^..8..X1.?.E.
0010 05 40 9e 2f 00 00 3f 11 d4 eb ac 10 b4 38 ef 10 .@./..?.....8..
0020 b4 38 cb 84 c3 50 05 2c bb 6d 47 01 2c 16 28 e2 .8...P...img...C
0030 87 f3 a6 e6 e6 e6 60 90 4c 8e 9b 40 33 58 46L...@3XM
0040 43 35 8c d8 00 00 01 0c 22 6f 9e 9b 45 0a 80 20 C3.....O...E..
0050 43 03 c2 6f 04 81 ed 00 70 08 1c 50 e7 04 5c 60

Frame (frame), 1358 bytes | Packets: 9058 · Displayed: 9058 (100.0%) · Dropped: 0 (0.0%) | Profile: Default

PMT Details



Wireshark 1.12.2 (v1.12.2-0-g898fa22 from master-1.12)

Filter: `ip.addr == 239.16.180.56`

No.	Time	Source	Destination	Protocol	Length	Info
5943	10.3606300			MPEG TS	1358	Source port: 52100 Destination port: 50000
5944	10.3612140			MPEG TS	1358	Program Map Table (PMT)
5945	10.3625650			MPEG TS	1358	Source port: 52100 Destination port: 50000
5946	10.3639070			MPEG TS	1358	Source port: 52100 Destination port: 50000

MPEG2 Program Map Table

Table ID: Program Map Table (PMT) (0x02)

- 1... .. = Syntax indicator: 1
- .011 ... = Reserved: 0x0003
- 0000 0010 0011 = Length: 35
- Program Number: 0x0001
- 11... .. = Reserved: 0x03
- ..00 000. = Version Number: 0x00
-1 = Current/Next Indicator: Currently applicable (0x01)
- Section Number: 0
- Last Section Number: 0
- 111. = Reserved: 0x0007
- ...0 0000 0110 0101 = PCR PID: 0x0065
- 1111 = Reserved: 0x000f
- 0000 0000 1100 = Program Info Length: 0x000c

Descriptor Tag=0x0b

Descriptor Tag=0x10

Stream PID=0x012c

Stream type: ITU-T Rec. H.262 | ISO/IEC 13818-2 Video or ISO/IEC 11172-2 constrained parameter video stream (0x02)

- 111. = Reserved: 0x0007
- ...0 0001 0010 1100 = Elementary PID: 0x012c
- 1111 = Reserved: 0x000f
- 0000 0000 0000 = ES Info Length: 0x0000

Stream PID=0x012d

Stream type: ISO/IEC 11172 Audio (0x03)

- 111. = Reserved: 0x0007
- ...0 0001 0010 1101 = Elementary PID: 0x012d
- 1111 = Reserved: 0x000f
- 0000 0000 0000 = ES Info Length: 0x0000

CRC: 0x8a3f3bea [Unverified]

Stuffing

ISO/IEC 13818-1 PID=0x12d CC=12

Reassembled in: 5947

03f0 c0 06 00 02 e1 2c f0 00 03 e1 2d f0 00 8a 3f 3b-...?;

0400 ea ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff

0410 ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff

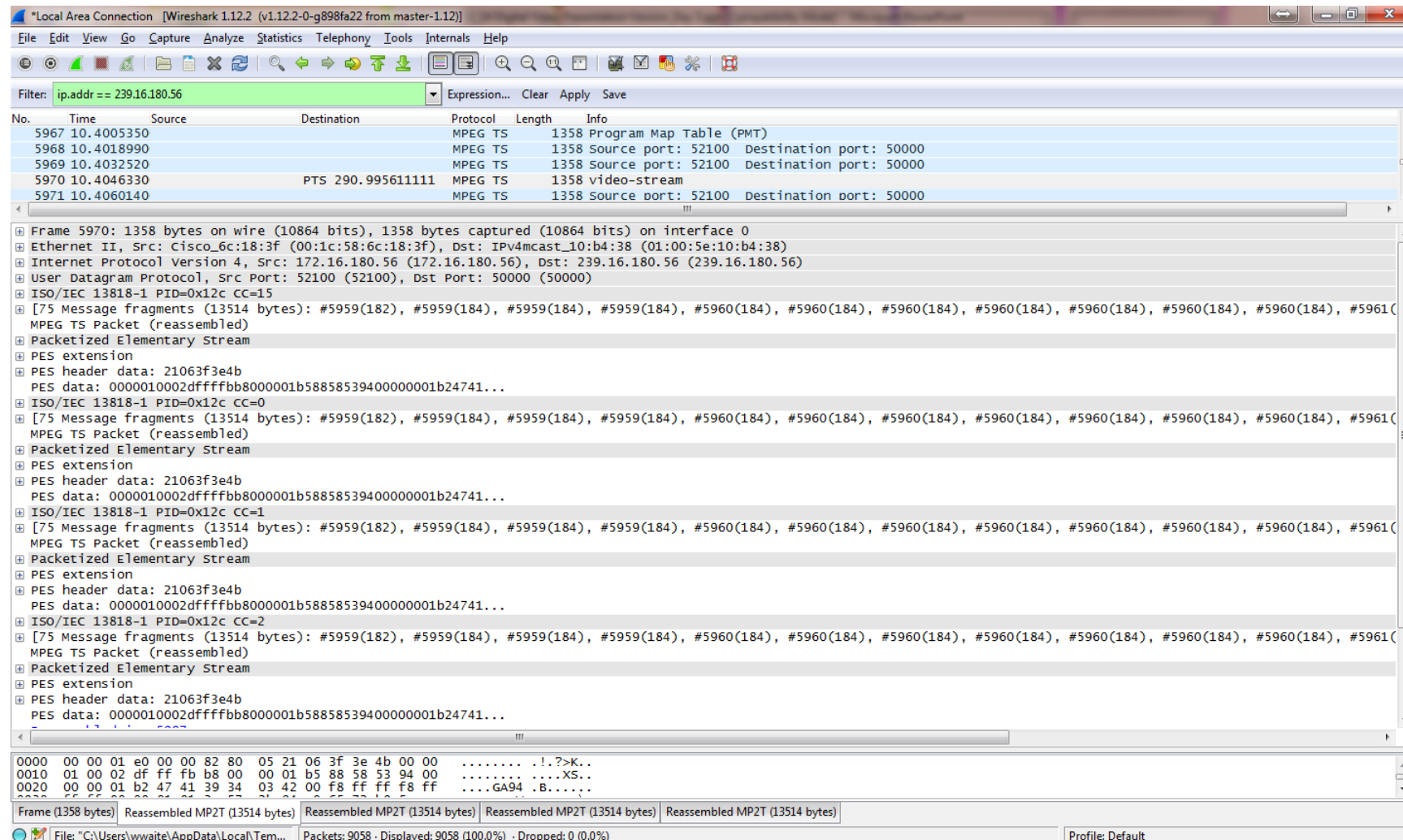
0420 ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff

0430 ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff

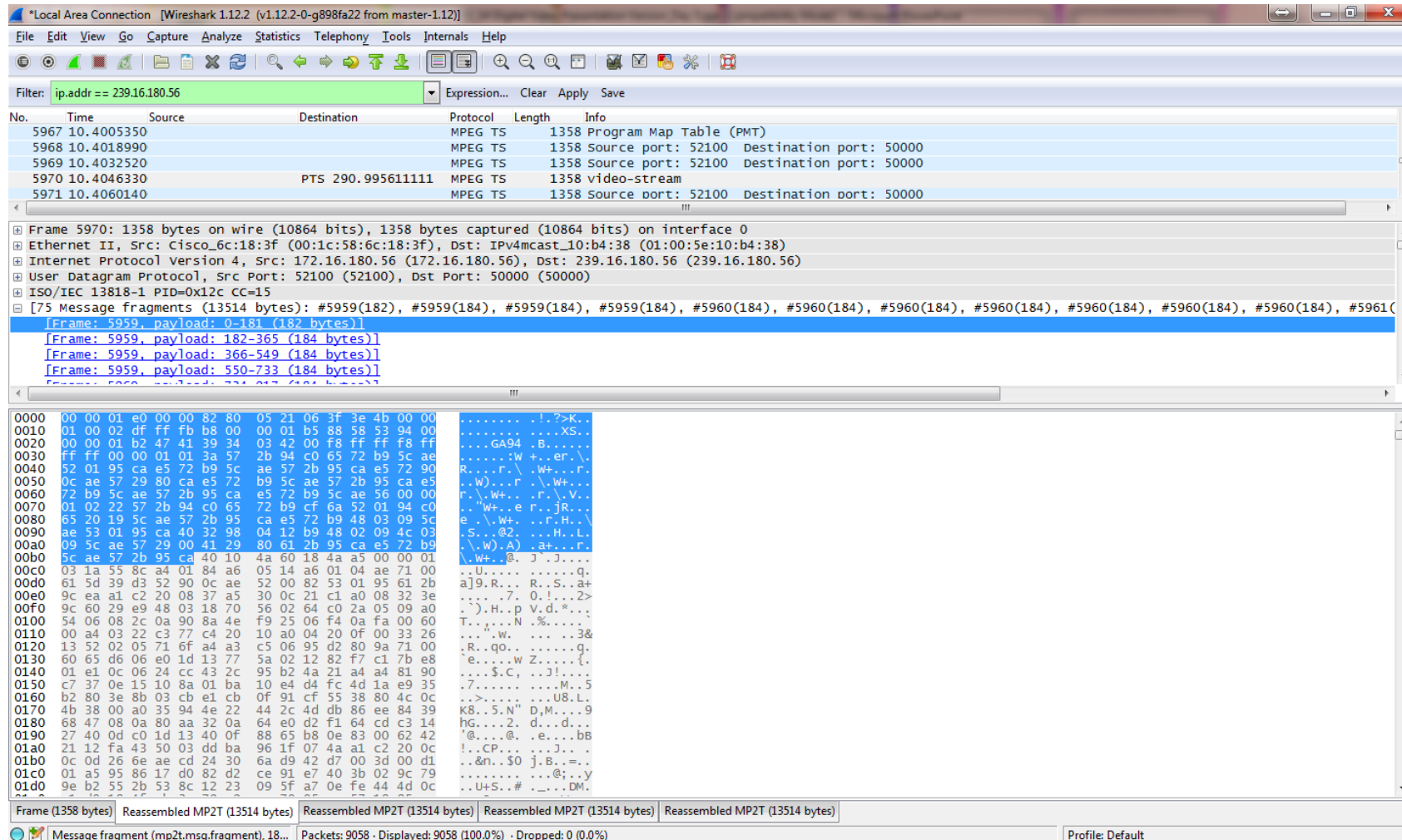
0440 ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff

Stream type (mpeg_pmt.stream.type), 1 byte | Packets: 9058 · Displayed: 9058 (100.0%) · Dropped: 0 (0.0%) | Profile: Default

Video Stream Details



Video Stream Raw Data



Audio Stream Raw Data



Wireshark 1.12.2 (v1.12.2-0-g898fa22 from master-1.12)

Filter: ip.addr == 239.16.180.56

No.	Time	Source	Destination	Protocol	Length	Info
5942	10.3585070			MPEG TS	1358	Source port: 52100 Destination port: 50000
5943	10.3606300			MPEG TS	1358	Source port: 52100 Destination port: 50000
5944	10.3612140			MPEG TS	1358	Program Map Table (PMT)
5945	10.3625650			MPEG TS	1358	Source port: 52100 Destination port: 50000
5946	10.3639070			MPEG TS	1358	Source port: 52100 Destination port: 50000
5947	10.3656620	384 kb/s	48 kHz	MPEG TS	1358	Audio Layer 2

Reassembled in: 5959

ISO/IEC 13818-1 PID=0x12c CC=14

Reassembled in: 5959

ISO/IEC 13818-1 PID=0x12c CC=15

Reassembled in: 5959

ISO/IEC 13818-1 PID=0x12d CC=0

[7 Message fragments (1166 bytes): #5933(184), #5933(184), #5944(184), #5945(184), #5946(184), #5946(184), #5947(62)]

[Frame: 5933, payload: 0-183 (184 bytes)]

[Frame: 5933, payload: 184-367 (184 bytes)]

[Frame: 5944, payload: 368-551 (184 bytes)]

[Frame: 5945, payload: 552-735 (184 bytes)]

[Frame: 5946, payload: 736-919 (184 bytes)]

[Frame: 5946, payload: 920-1103 (184 bytes)]

[Frame: 5947, payload: 1104-1165 (62 bytes)]

[Message fragment count: 7]

[Reassembled MP2T length: 1166]

MPEG TS Packet (reassembled)

Packetized Elementary Stream

PES extension

PES header data: 21063da7a5

Moving Picture Experts Group Audio

Data: c41a9966556666667767666666b6db6ddb6db6db692d0000...

ISO/IEC 13818-1 PID=0x12d CC=1

Reassembled in: 5959

02e0 23 30 88 cc 2a 85 15 0a 30 aa 61 54 f6 a1 ed 43 #0.~*... 0.aT...E

02f0 56 5d 55 97 51 9e 9d ae 10 e7 21 ce 7c 2e f8 5d v]U.Q... .!..[.]

0300 8d 9b 1b 36 4b 64 b2 35 23 5a 94 a9 47 e0 7e 08 ..6kd.5 #Z..G.-

0310 14 30 39 21 a7 43 4e c4 91 89 21 8b 2b 16 57 c6 .09!.CN. .!..+W.

0320 4f 94 ae 95 dd 2b 26 4d 96 7b 67 bb 7e 43 9b 2e 0....+M. [g.~C..

0330 19 12 6d 29 b0 d9 4d a6 de 75 d7 9d 75 b0 93 61 ..m)..M. .u..u..a

0340 26 2a cc 55 a2 77 44 ee ce 14 33 85 03 35 c8 b6 &*..U.WD. .3..5..

0350 ec 97 e9 2f d4 7d 28 fa 3c d4 79 a9 02 70 27 0a .../.)(<.y.p'

0360 f0 af 34 f3 4f 10 f1 0f cb 6f 55 cc e0 e9 c1 ce ..4.O... .OU....

0370 8b 1d 16 19 37 32 6e c5 a9 8b 54 d7 19 ae 2f 5b ...72n. .T..../[

0380 d7 2c 92 c8 e4 b3 4f 9b 92 cc be 73 d3 3d a0 99O. ...S.=..

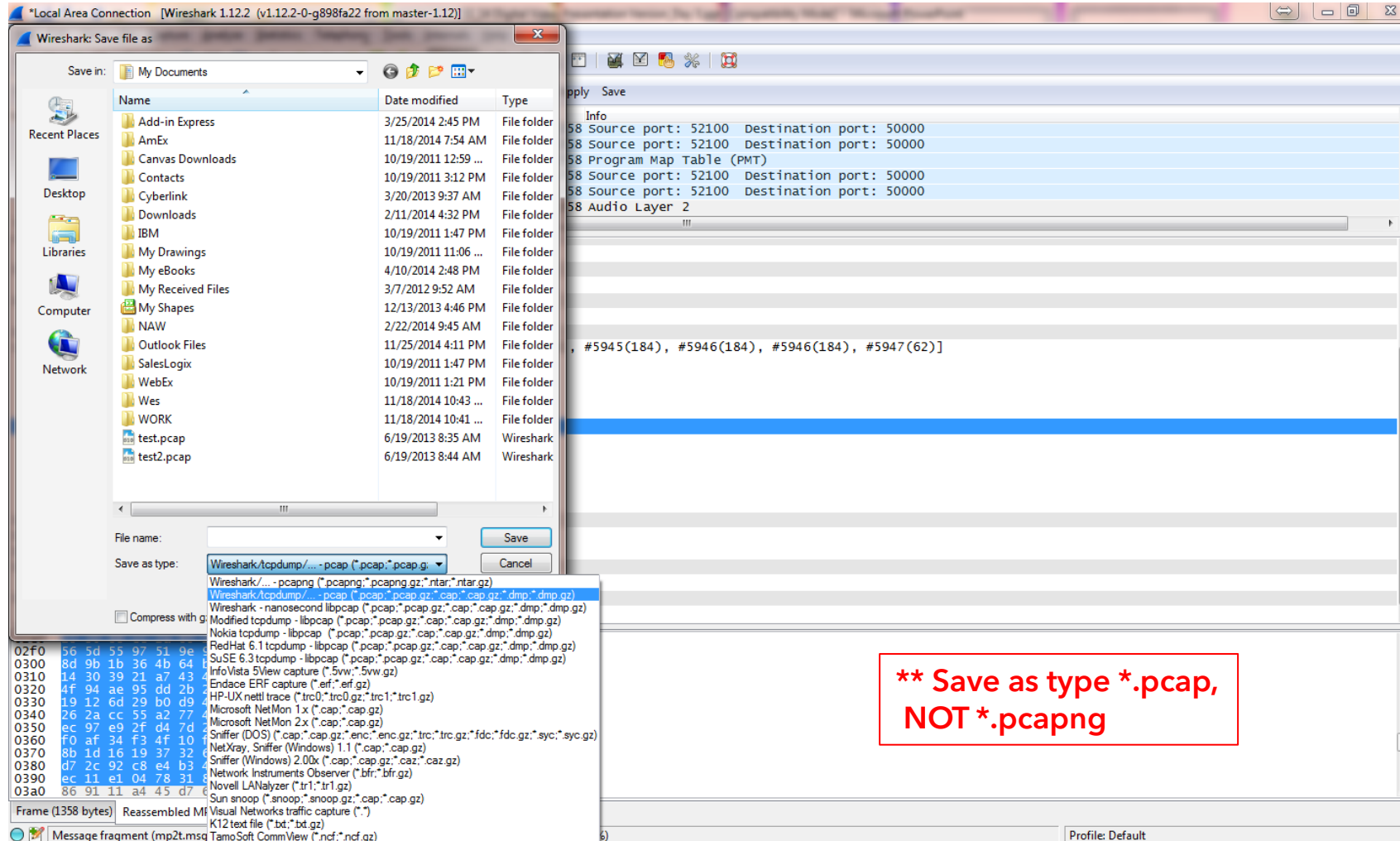
0390 ec 11 e1 04 78 31 8a 63 14 ea e1 b5 c4 69 b8 d3x1.ci..

03a0 86 91 11 a4 45 d7 6b 67 b1 6a 18 d3 b1 8d b3 1bE.kq .j.....

Frame (1358 bytes) Reassembled MP2T (1166 bytes) Bitstring tvb (2 bytes)

Message fragment (mp2t.msg.fragment), 18... Packets: 9058 · Displayed: 9058 (100.0%) · Dropped: 0 (0.0%) Profile: Default

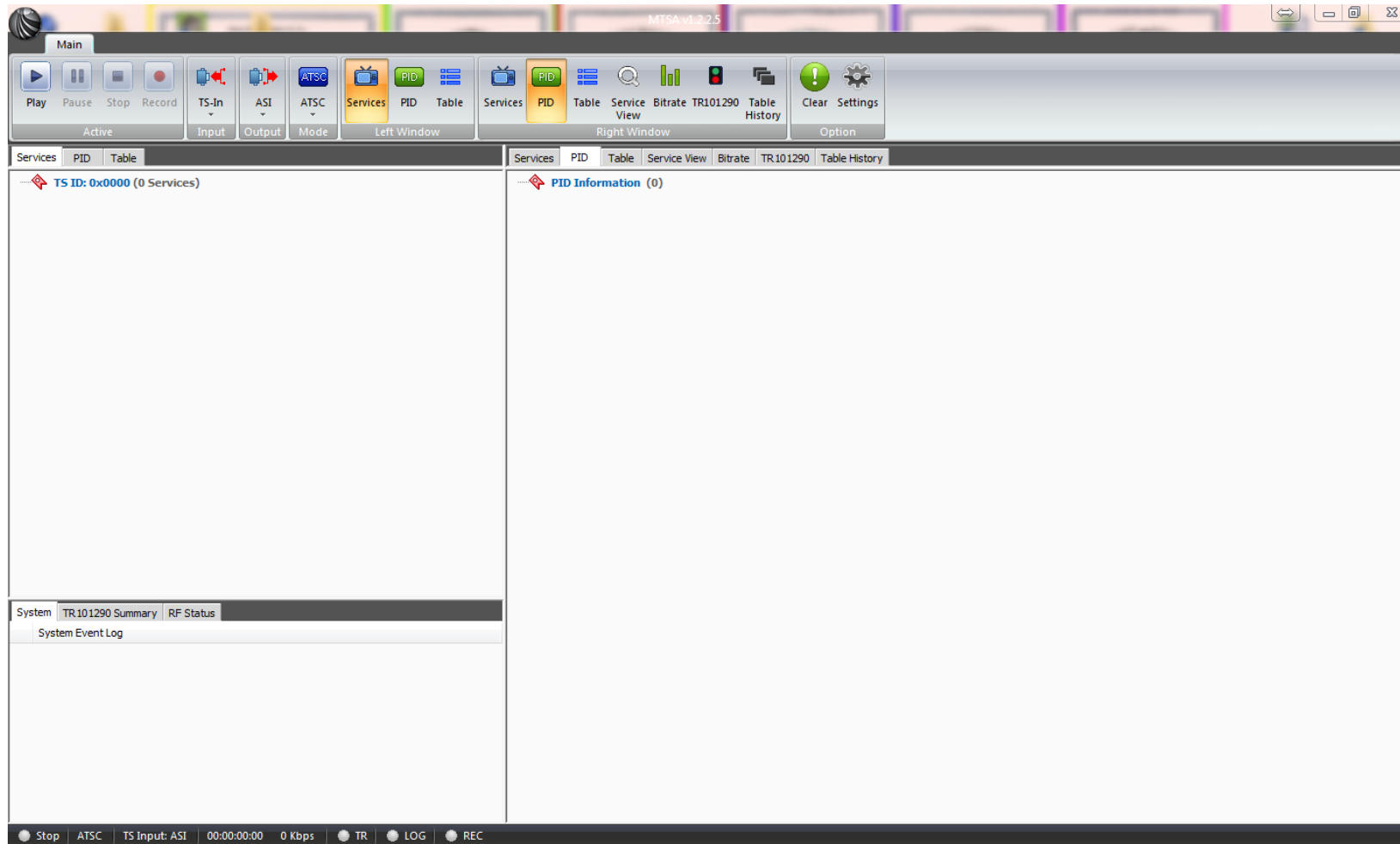
Saving TS for Engineering Evaluation



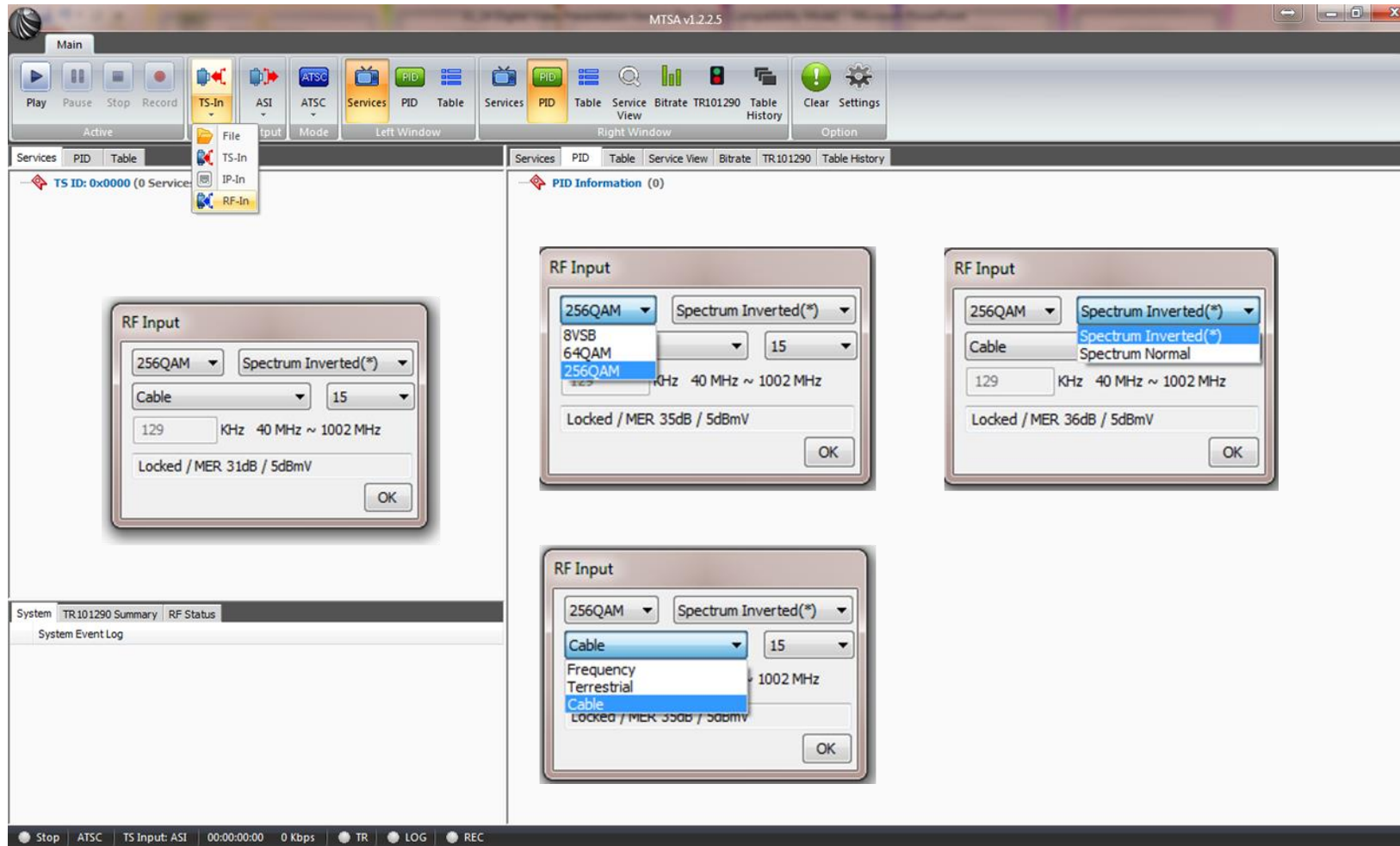
MTSA-PRO



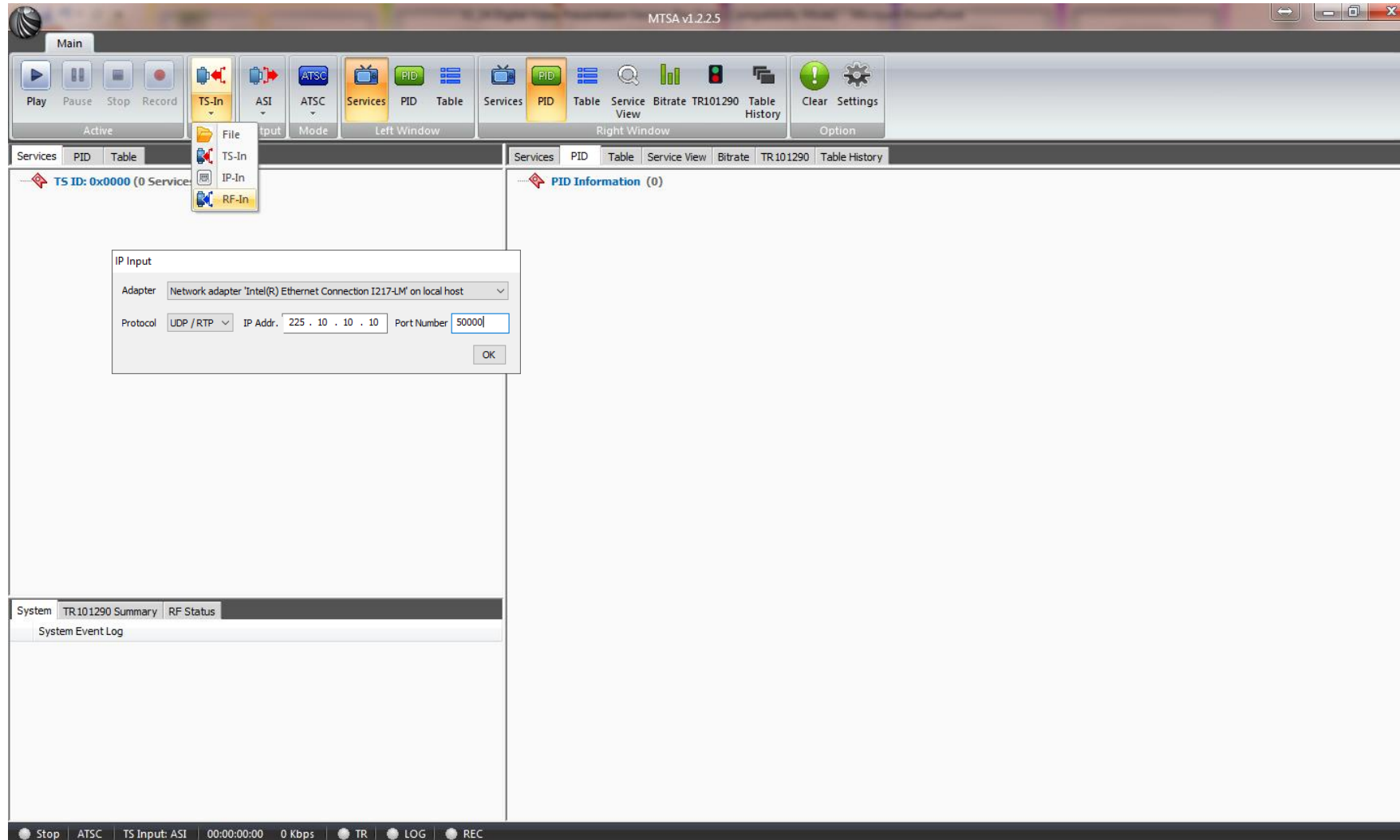
MTSA-PRO Software



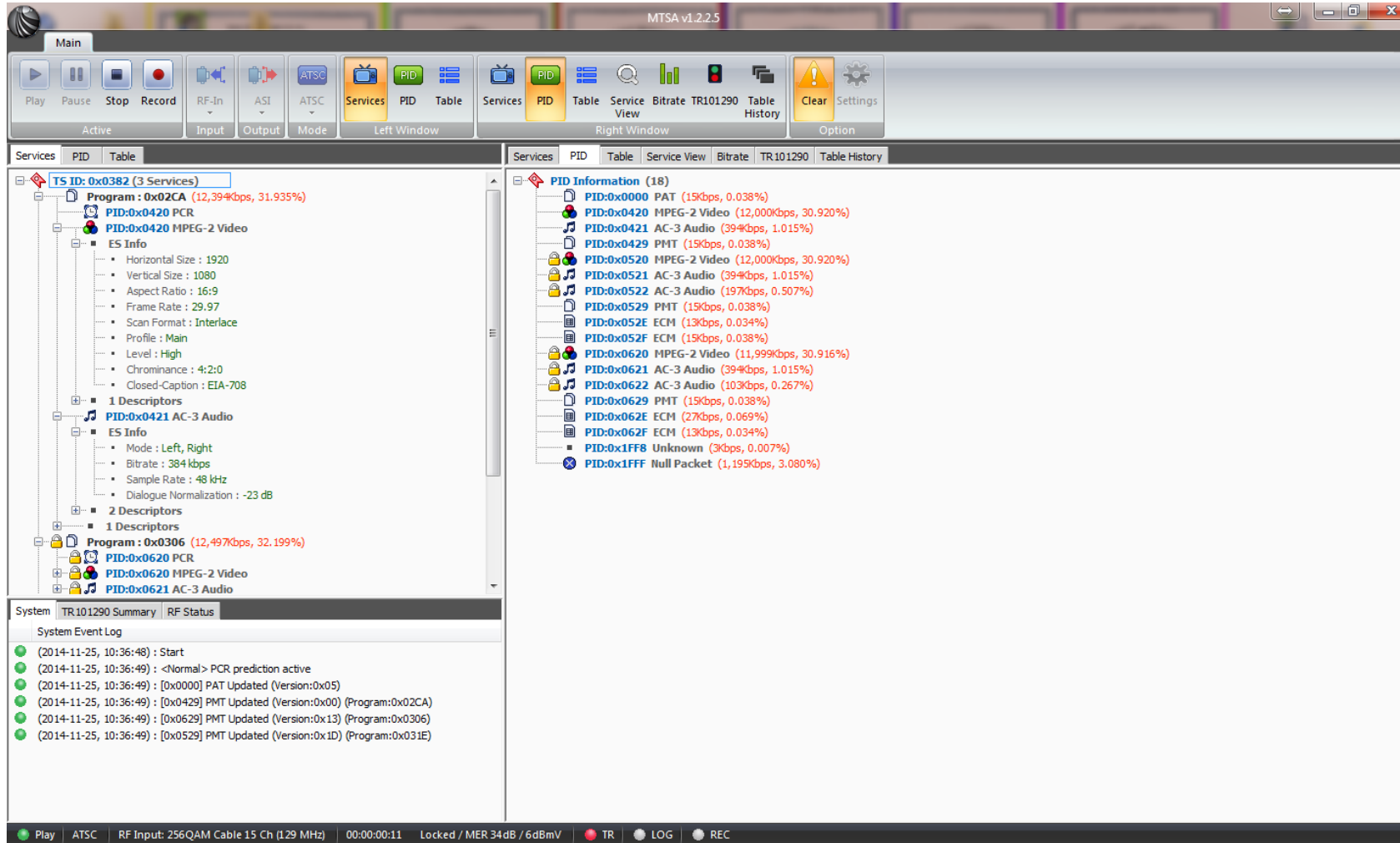
MTSA-PRO Software Setup RF Input



MTSA-PRO Software Setup IP Input



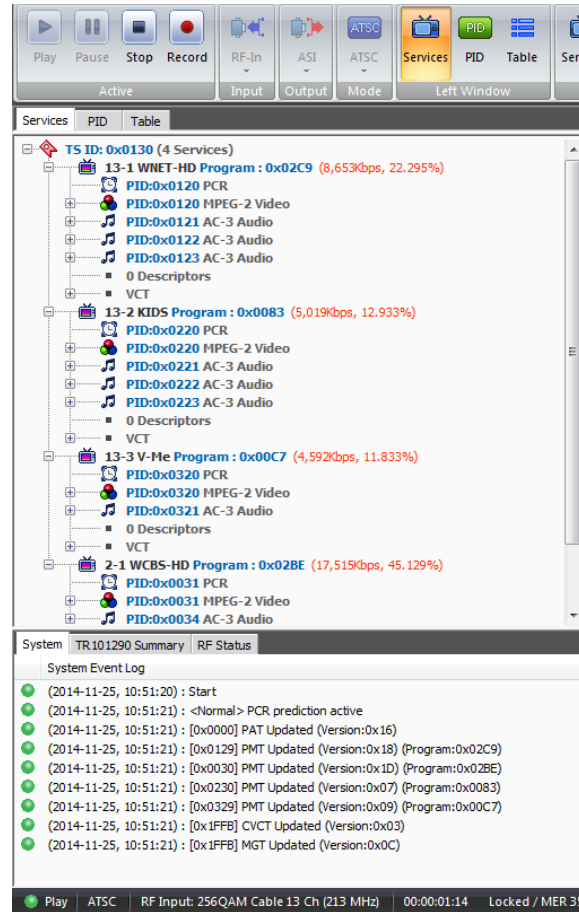
Playing the Stream



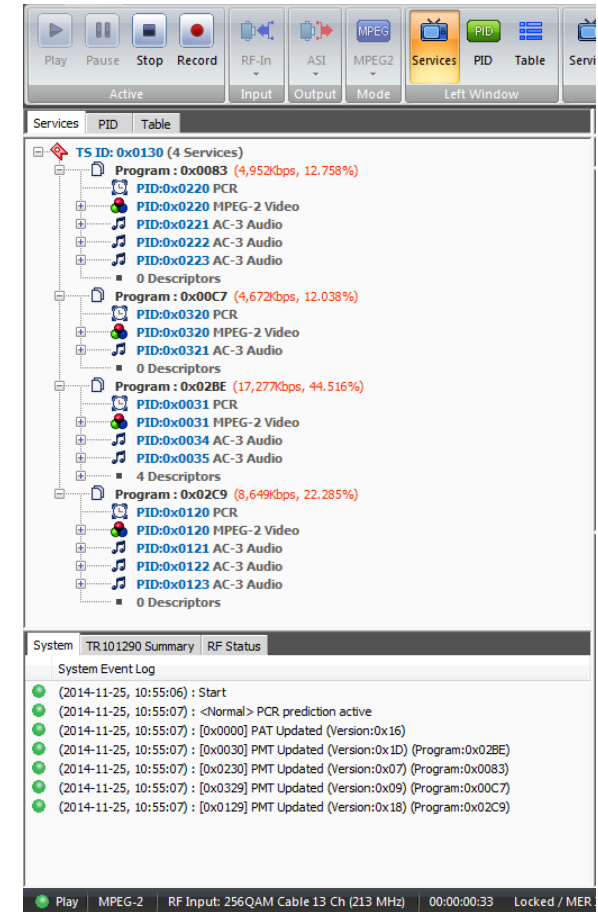
The screenshot displays the MTSA v1.2.2.5 software interface, which is used for monitoring and playing digital video streams. The interface is divided into several sections:

- Main Toolbar:** Includes buttons for Play, Pause, Stop, Record, RF-In, ASI, ATSC, Services, PID, Table, Service View, Bitrate, TR101290, Table History, Clear, and Settings.
- Left Window:** Shows the selected TS ID (0x0382) and its services. The selected service is Program: 0x02CA (12,394Kbps, 31.935%). It lists various descriptors and their details, such as ES Info (Horizontal Size: 1920, Vertical Size: 1080, Aspect Ratio: 16:9, Frame Rate: 29.97, Scan Format: Interlace, Profile: Main, Level: High, Chrominance: 4:2:0, Closed-Caption: EIA-708) and 1 Descriptors.
- Right Window:** Displays PID Information (18) for the selected service. It lists various PIDs and their details, including PAT (19Kbps, 0.038%), MPEG-2 Video (12,000Kbps, 30.920%), AC-3 Audio (394Kbps, 1.015%), PMT (19Kbps, 0.038%), and Null Packet (1,195Kbps, 3.080%).
- System Section:** Shows the TR101290 Summary and RF Status. It includes a System Event Log with timestamps and messages, such as (2014-11-25, 10:36:48) : Start and (2014-11-25, 10:36:49) : <Normal> PCR prediction active.
- Status Bar:** Displays the current state of the system, including Play, ATSC, RF Input: 256QAM Cable 15 Ch (129 MHz), 00:00:00:11, Locked / MER 34dB / 6dBmV, TR, LOG, and REC.

ATSC vs. MPEG-2 Mode

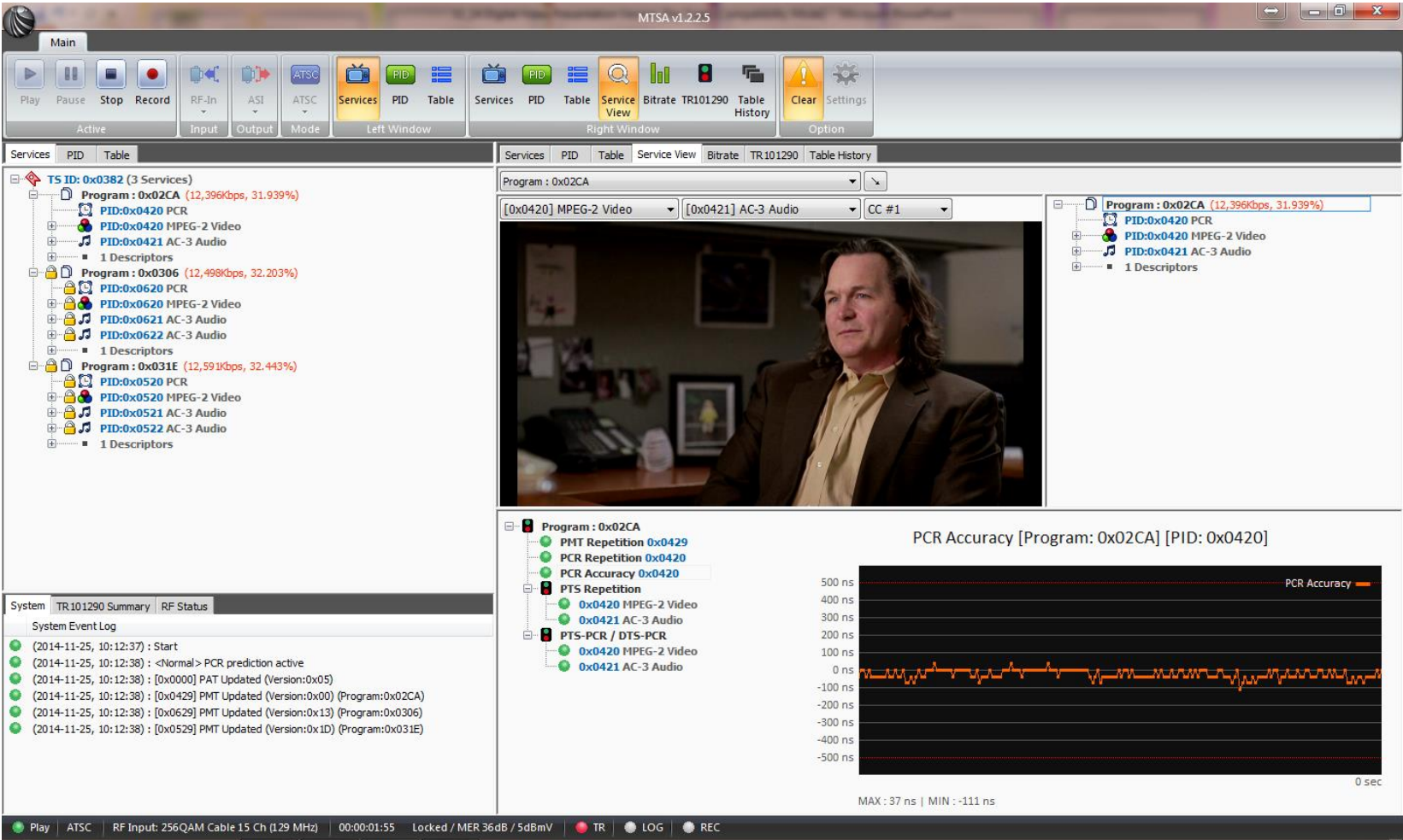


ATSC Mode adds PSIP tables (MGT, VCT, etc.)
Including channel number and name.

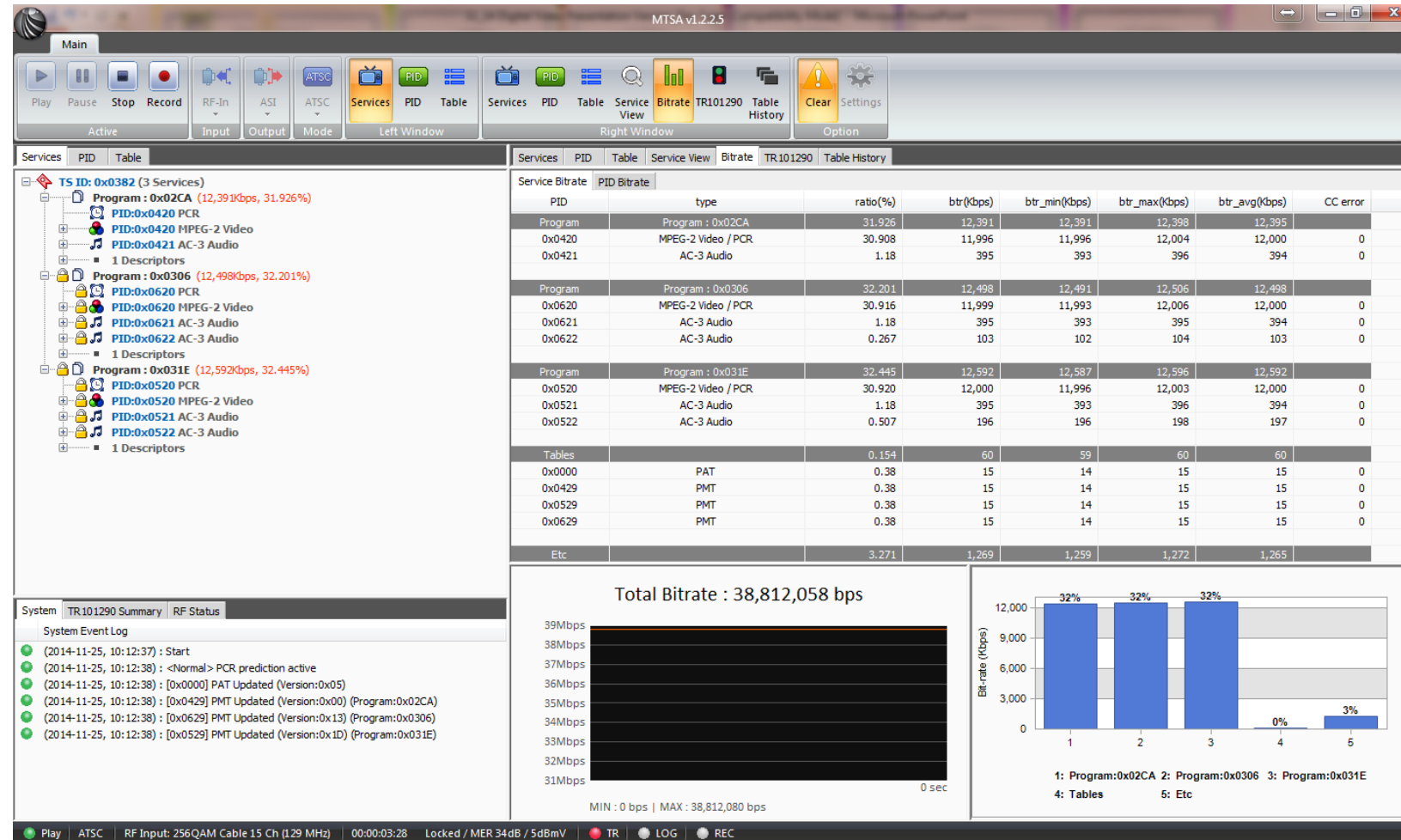


MPEG-2 mode re-orders the programs by
Hex number of PIDs

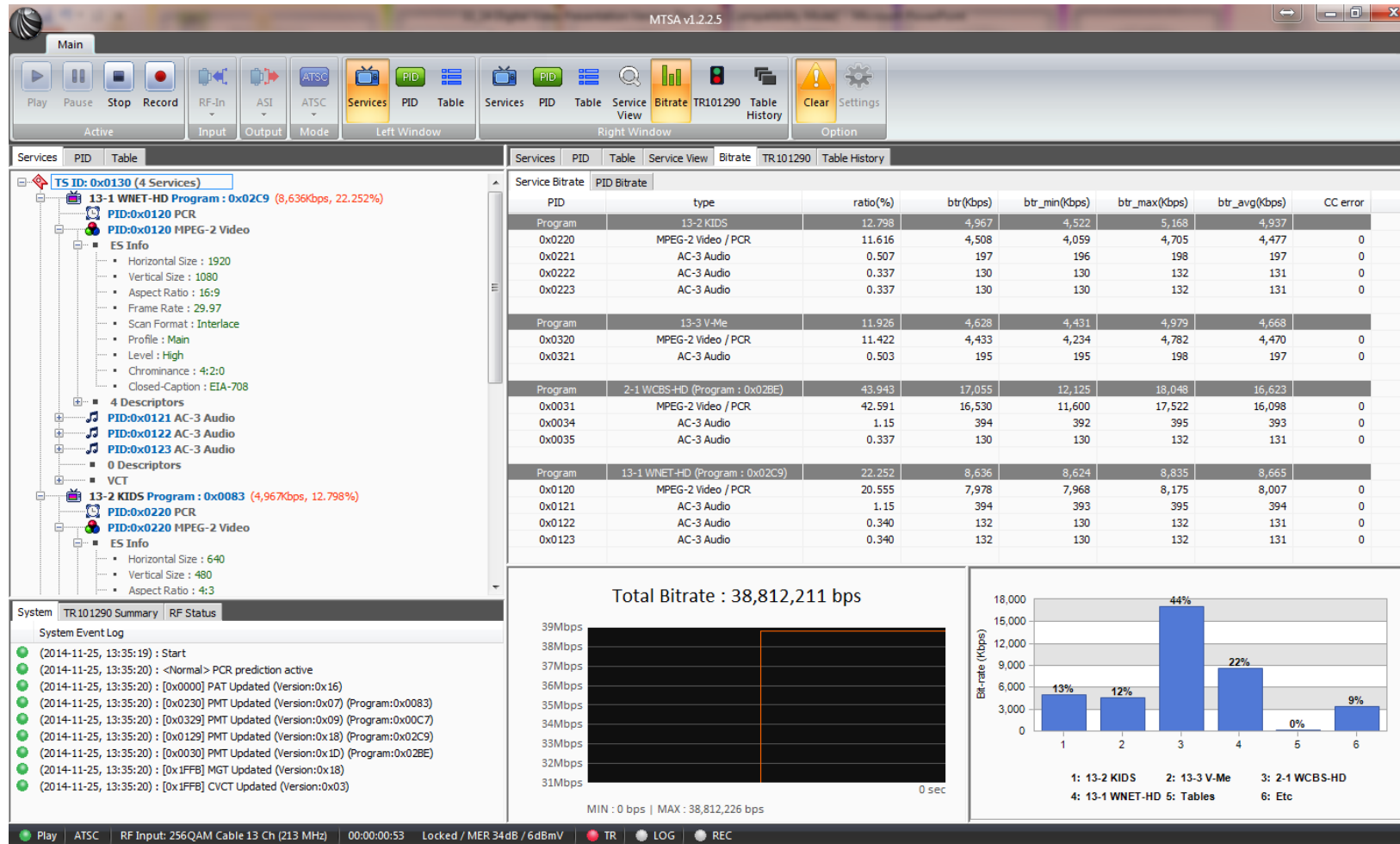
Service View



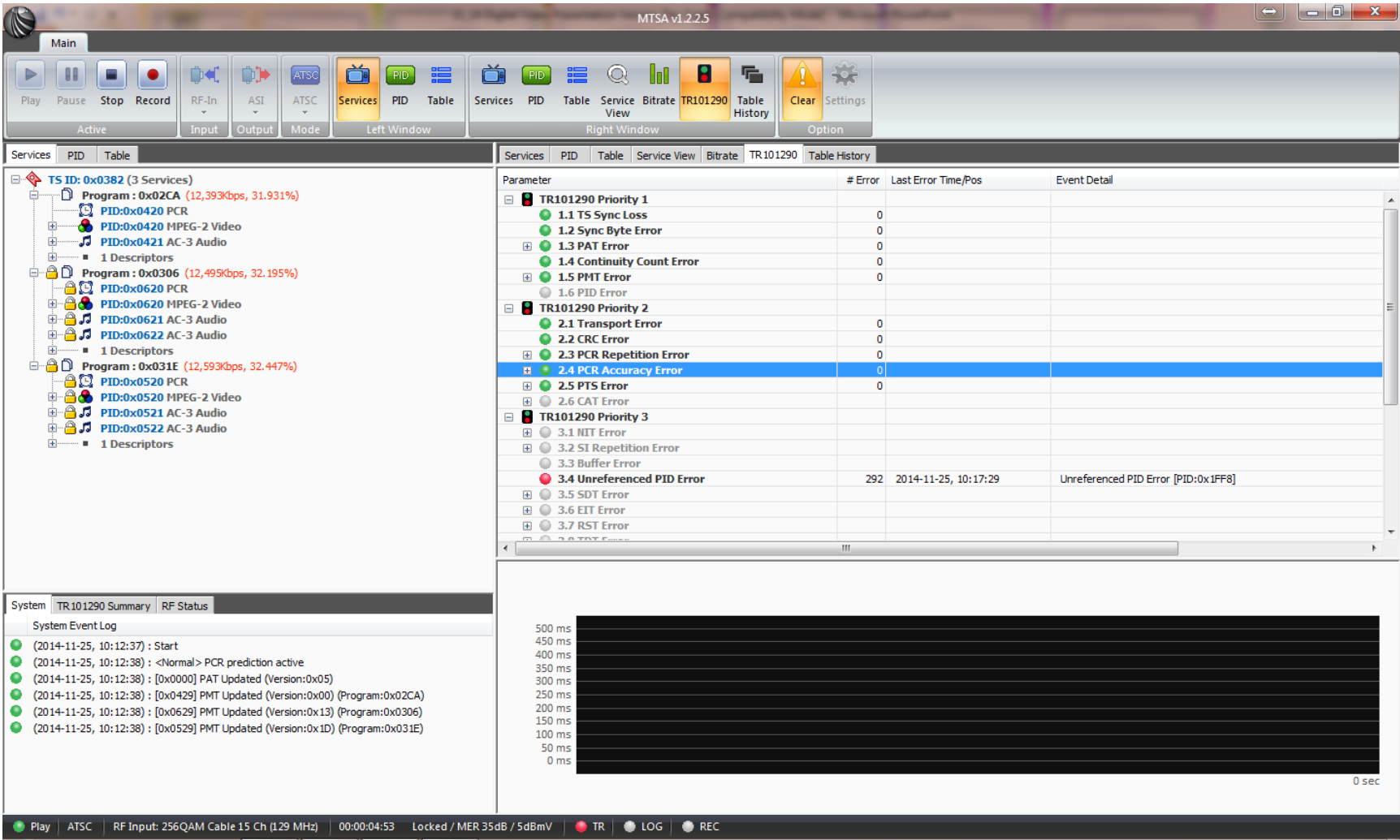
Bitrate



Bitrate 2



TR 101 290 Errors



TR 101 290 Errors

No.	Indicator	Comment
1.1	TS_sync_loss	Essential for access to TS data
1.2	Sync_byte_error	May not necessarily prevent decoding of content
1.3	PAT_error	Essential for access to TS data
1.3.a	PAT_error_2	Essential for access to TS data
1.4	Continuity_count_error	May not necessarily prevent decoding of content
1.5	PMT_error	Essential for access to TS data
1.5.a	PMT_error_2	Essential for access to TS data
1.6	PID_error	May not necessarily prevent decoding of content

No.	Indicator	Comment
2.1	Transport_error	
2.2	CRC_error	Applies to PAT and PMT only
2.3	PCR_error	
2.3a	PCR_repetition_error	
2.3b	PCR_discontinuity_indicator_error	
2.4	PCR_accuracy_error	
2.5	PTS_error	
2.6	CAT_error	

No.	Indicator	Comment
3.3	Buffer_error	
3.4	Unreferenced_PID	
3.4.a	Unreferenced_PID	
3.9	Empty_buffer_error	
3.10	Data_delay_error	

Table History



MTSA v1.2.2.5

Main

Play

Pause

Stop

Record

RF-In

ASI

ATSC

Services

PID

Table

Services

PID

Table

Service View

Bitrate

TR101290

Table History

Clear

Settings

Active

Input

Output

Mode

Left Window

Right Window

Option

Services

PID

Table

Services

PID

Table

Service View

Bitrate

TR101290

Table History

TS ID: 0x0382 (3 Services)

Program : 0x02CA (12,397Kbps, 31.942%)

PID:0x0420 PCR

PID:0x0420 MPEG-2 Video

ES Info

Horizontal Size : 1920

Vertical Size : 1080

Aspect Ratio : 16:9

Frame Rate : 29.97

Scan Format : Interlace

Profile : Main

Level : High

Chrominance : 4:2:0

Closed-Caption : EIA-708

1 Descriptors

PID:0x0421 AC-3 Audio

ES Info

Mode : Left, Right

Bitrate : 384 kbps

Sample Rate : 48 kHz

Dialogue Normalization : -23 dB

2 Descriptors

1 Descriptors

Program : 0x0306 (12,502Kbps, 32.213%)

PID:0x0620 PCR

PID:0x0620 MPEG-2 Video

PID:0x0621 AC-3 Audio

System

TR101290 Summary

RF Status

System Event Log

(2014-11-25, 10:36:48) : Start

(2014-11-25, 10:36:49) : <Normal> PCR prediction active

(2014-11-25, 10:36:49) : [0x0000] PAT Updated (Version:0x05)

(2014-11-25, 10:36:49) : [0x0429] PMT Updated (Version:0x00) (Program:0x02CA)

(2014-11-25, 10:36:49) : [0x0629] PMT Updated (Version:0x13) (Program:0x0306)

(2014-11-25, 10:36:49) : [0x0529] PMT Updated (Version:0x1D) (Program:0x031E)

Table

Full Name

PAT

Program Association Table

PMT

Program Map Table

[PID:0x0429] Program : 0x02CA

[Current] Version : 0x00

Section : 000 (1/1)

[PID:0x0529] Program : 0x031E

[Current] Version : 0x1D

Section : 000 (1/1)

[PID:0x0629] Program : 0x0306

[Current] Version : 0x13

Section : 000 (1/1)

Parameter

Hex

Value

Bits

Description

PMT - Transport Stream Program Map Section

Section Header

0x02

2

64

PMT Information

Table ID

0x02

2

8

Section Syntax Indicator

0x01

1

1

'0'

0x00

0

1

Reserved

0x03

3

2

Section Length

0x0029

41

12

Program Number

0x02CA

714

16

Reserved

0x03

3

2

Version Number

0x00

0

5

Current Next Indicator

0x01

1

1

Section Number

0x00

0

8

Last Section Number

0x00

0

8

Reserved

0x07

7

3

PCR PID

0x0420

1056

13

Reserved

0x0F

15

4

Program Info Descriptor Length

0x0006

6

12

Registration Descriptor

0x05

5

48

ES Info

0x02

2

64

Stream Type

0x02

2

8

Reserved

0x07

7

3

Elementary PID

0x0420

1056

13

Reserved

0x0F

15

4

ES Info Descriptor Length

0x0003

3

12

Stream Identifier Descriptor

0x52

82

24

ES Info

0x81

129

112

AC-3 Audio

CRC 32

0xA67...

27927...

32

CRC OK

Address

Hex

00000

02 80 29 02 CA C1 00 00 E4 20 F0 06 05 04 43 55

00010

45 49 02 E4 20 F0 03 52 01 01 81 E4 21 F0 09 0A

00020

04 65 6E 67 00 52 01 02 A6 75 A8 A3

00017

52

0101 0010

R

00018

01

0000 0001

.

00019

01

0000 0001

.

Play

ATSC

RF Input: 256QAM Cable 15 Ch (129 MHz)

00:00:02:48

Locked / MER 34dB / 6dBmV

TR

LOG

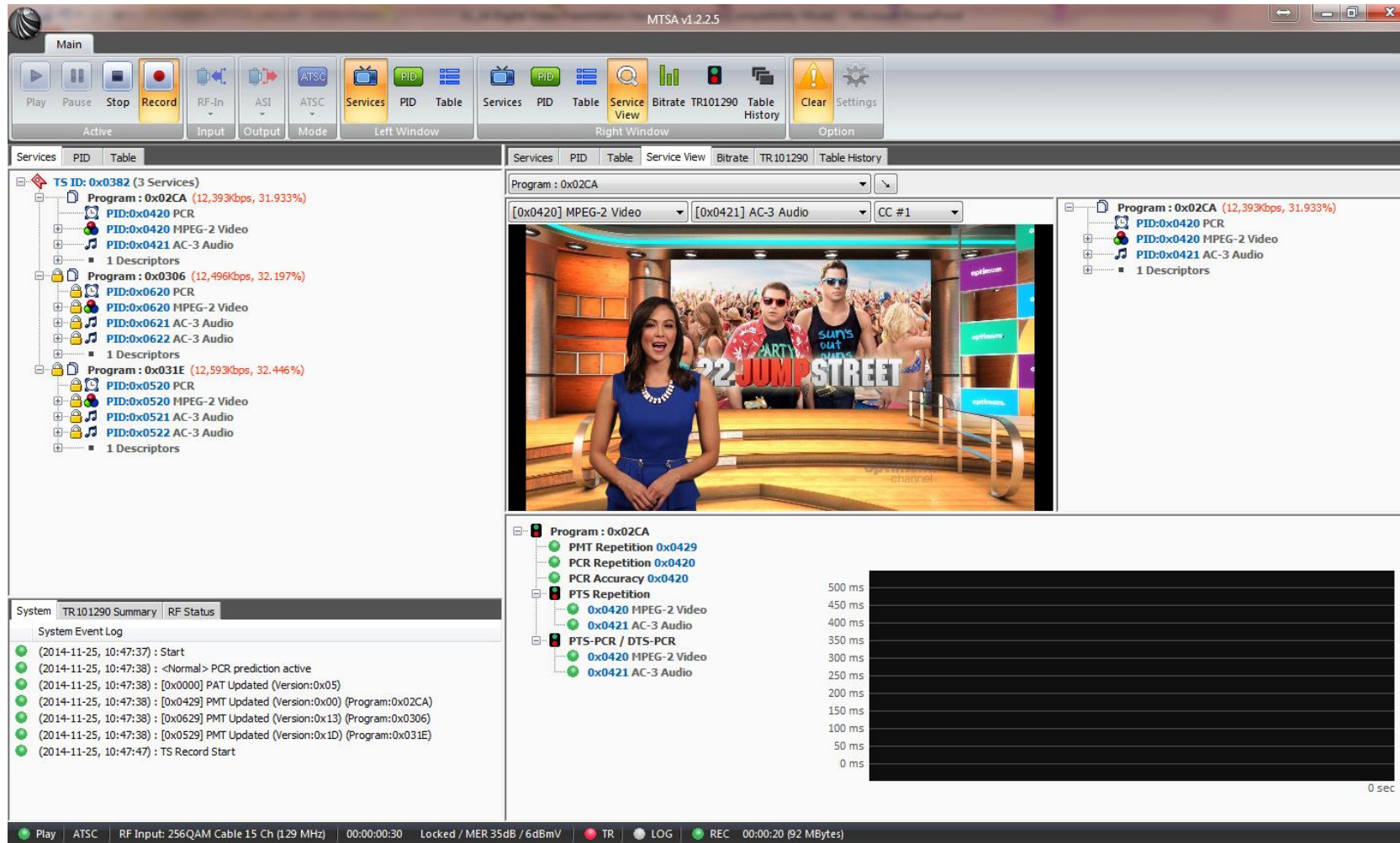
REC

Setup Recording



The image shows the MTSA v1.2.2.5 software interface. The main window is divided into several panes. The left pane shows a tree view of services, including Program 0x02CA (12,394 kbps, 31.934%) and Program 0x0306 (12,497 kbps, 32.201%). The right pane shows a list of parameters and errors, including TR101290 Priority 1, 2, and 3, and various error types like 1.1 TS Sync Loss, 1.2 Sync Byte Error, 1.3 PAT Error, 1.4 Continuity Count Error, 1.5 PMT Error, 1.6 PID Error, 2.1 Transport Error, 2.2 CRC Error, 2.3 PCR Repetition Error, 2.4 PCR Accuracy Error, 2.5 PTS Error, 2.6 CAT Error, 3.1 NIT Error, 3.2 SI Repetition Error, 3.3 Buffer Error, 3.4 Unreferenced PID Error, 3.5 SDT Error, 3.6 EIT Error, and 3.7 RST Error. A 'Settings' dialog box is open, showing the 'General' tab with the 'Path' set to 'C:\Program Files\Blonder Tongue\MTSA\Record\'. The 'Log Record' section has 'Record Enable' checked, and 'Include System Message', 'Include Table Update', and 'Include TR 101 290 Message' are also checked. The bottom status bar shows 'Stop', 'ATSC', 'RF Input: 256QAM Cable 15 Ch (129 MHz)', '00:00:03:29', 'Locked / MER 43dB / 6dBmV', 'TR', 'LOG', and 'REC'.

Record a Stream

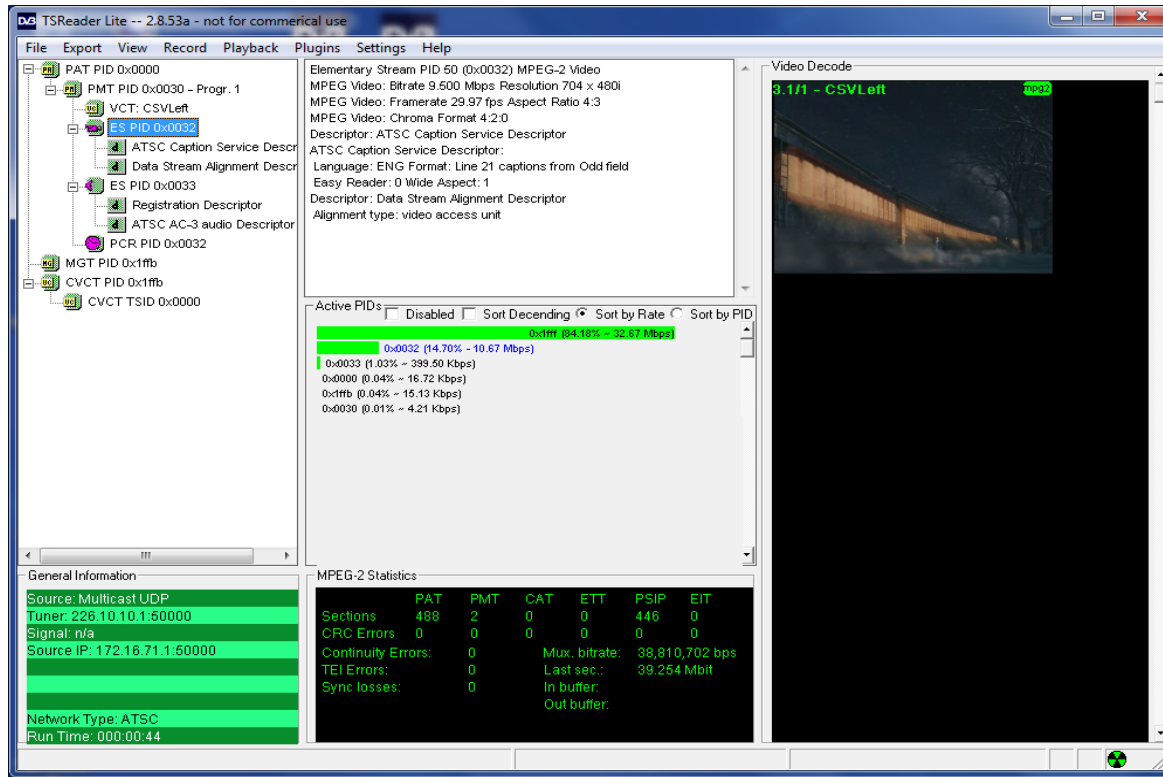


The screenshot displays the MTSA v1.2.2.5 software interface, which is used for recording and analyzing digital video streams. The interface is divided into several sections:

- Top Bar:** Contains playback controls (Play, Pause, Stop, Record), input/output modes (RF-In, ASI, ATSC), and window management (Services, PID, Table, Service View, Bitrate, TR101290, Table History, Clear, Settings).
- Left Panel:** A tree view showing the structure of the recorded stream. It lists three services:
 - TS ID: 0x0382 (3 Services):**
 - Program : 0x02CA (12,393Kbps, 31.933%)
 - PID:0x0420 PCR
 - PID:0x0420 MPEG-2 Video
 - PID:0x0421 AC-3 Audio
 - 1 Descriptors
 - Program : 0x0306 (12,496Kbps, 32.197%)
 - PID:0x0620 PCR
 - PID:0x0620 MPEG-2 Video
 - PID:0x0621 AC-3 Audio
 - PID:0x0622 AC-3 Audio
 - 1 Descriptors
 - Program : 0x031E (12,593Kbps, 32.446%)
 - PID:0x0520 PCR
 - PID:0x0520 MPEG-2 Video
 - PID:0x0521 AC-3 Audio
 - PID:0x0522 AC-3 Audio
 - 1 Descriptors
- Center Panel:** Displays a video preview window showing a scene from the movie "22 Jump Street". Above the preview, the selected program (0x02CA) and its components (MPEG-2 Video, AC-3 Audio, CC #1) are shown.
- Right Panel:** A detailed view of the selected program (0x02CA), showing its components and descriptors.
- Bottom Panel:** A system event log and a timeline graph. The log shows events such as "Start", "PCR prediction active", "PMT Updated", and "TS Record Start". The timeline graph shows the duration of various stream components (PMT, PCR, PTS, etc.) over time.

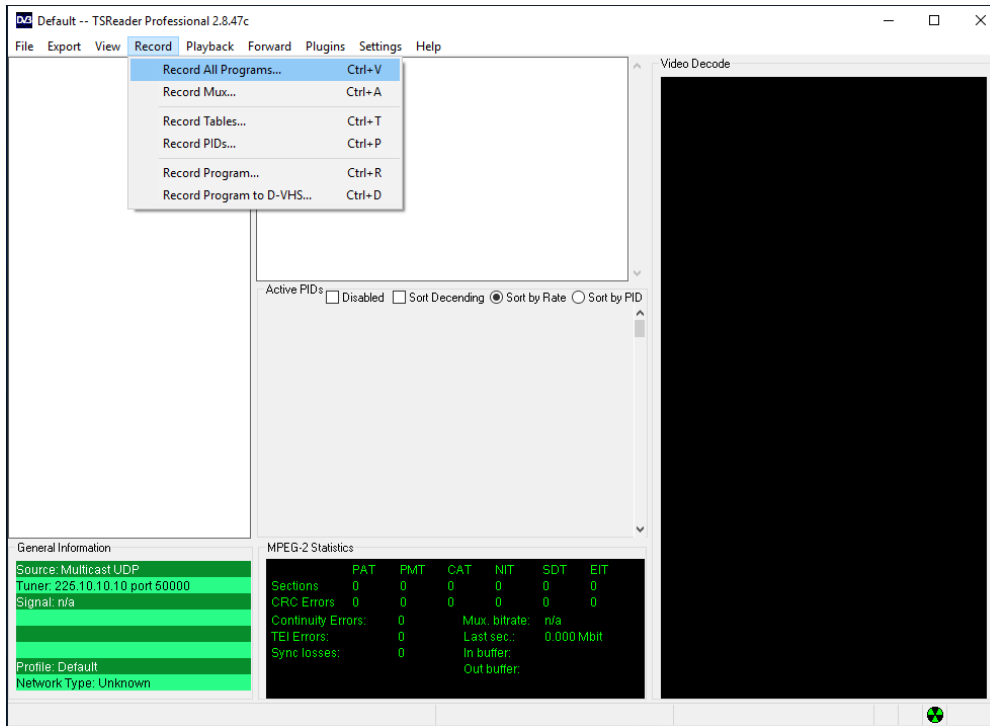
The status bar at the bottom indicates the current recording status: Play, ATSC, RF input: 256QAM Cable 15 Ch (129 MHz), 00:00:00:30, Locked / MER 35dB / 6dBmV, TR, LOG, REC, 00:00:20 (92 MBytes).

TSReader



- TSReader will show all PID data, tables, etc.
- You can record and playback streams
- Clicking the Video Decode sample of the video stream will open VLC for viewing (limited to 2 minutes on Lite version)
- Having a QAM/8VSB tuner, can use that as well as TS Reader
- Shows Continuity Errors, Sync Loss, etc.
- Recording in TSReader Lite version limited to 2 minutes

TSReader - Record a stream



- Record 2-3 minute stream
- Send to Blonder Tongue for evaluation

Sending TSRecordings to BT



- Wireshark recordings must be saved as .pcap
- **Do not** add any filters to Wireshark recording, unless specifically instructed
- Wireshark, MTSA-PRO or TSReader recordings should be 2-3 minutes long
- Required Information
 - What equipment is generating TS (Model/Brand)
 - Diagram of network, including switches and routers
 - Where in network each capture is made
 - What is the issue
- BT will only evaluate BT/Drake product-produced TS at no charge. Any non-BT/Drake product-produced streams will be charged a fee to evaluate and suggest how to correct the issue
- Contact for sending in TS captures : techsupport@blondertongue.com
- Someone from BT Support will provide FTP link to upload capture (**Do not** try and send captures via e-mail – too large!)

- Blonder Tongue can also remotely assist in Encoder setup and troubleshooting of network issues
- We use TeamViewer 12 or GoToMeeting
 - For TeamViewer 12, search 'teamviewer 12' and find older versions, or contact BT Tech Support for Quick Start Setup
 - For GoToMeeting - contact Tech Support - they will provide a link
- Remote computer must have internet access and local access to encoders
- Tech Support needs network diagram of how all components are connected
- **No** fee for Blonder Tongue products
- Fees will apply if non-Blonder Tongue products
- All support (phone and remote log-in) Monday - Friday 8:30 - 4:30pm ET