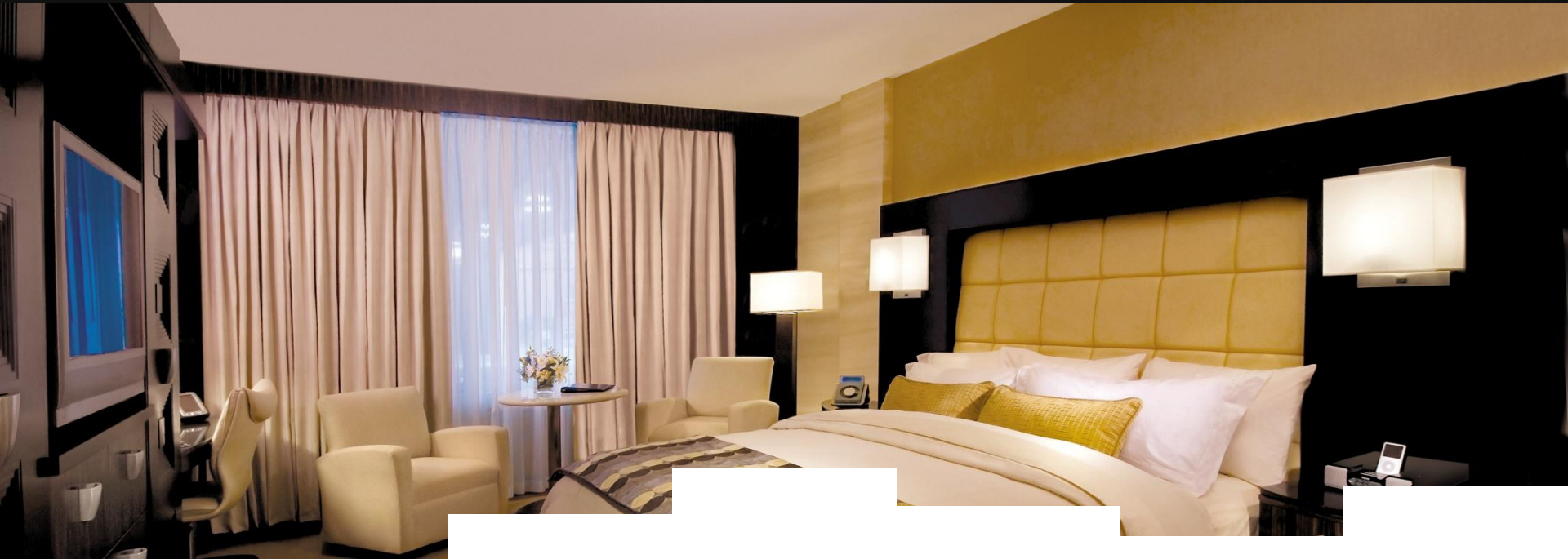# TECHNICOLOR COM1000/COM2000
System Training Workshop

COM1000/COM2000 System Troubleshooting

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Welcome

Welcome to the Technicolor COM1000/2000 System Troubleshooting workshop

Your instructor is Mark Anderson

The Technicolor MCS Management Team is:

- Rob Rhodes – Director of R&D
- Doug Strachota – Product Manager
- Tony Watters – Sales Manager

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Classroom Etiquette

Please DO

- Turn all cellphones to vibrate or off
- Keep all conversations relevant to the current topic
- Feel free to ask questions when needed

Please DO NOT

- Talk on your cell phone
- Carry on side conversations
- Be afraid to ask questions
- Be disruptive to others in the class

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Troubleshooting

Defined

The identification and resolution of problems, especially problems of a technical nature

The process of solving problems, especially complicated problems in a system

Philosophy

To get to the root cause of a given system failure in the least number of steps possible by partitioning the system into manageable sections, using the symptoms to pick a starting point and following the signal through the various sections until the offender is identified

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THE COM1000 HEAD END

Front view of a COM200 chassis with 12 COM24 cards and a QAM6 installed

COM1000 HEAD END COMPONENTS

COM24   COM24-FLX   COM46   COM46-FLX   GbE1

QAM6

COM200

ATSC-8

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A COM1000 HEAD END MAY INCLUDE

- COM24 cards

- COM24-FLX cards

- COM46 cards

- COM46-FLX cards

- QAM6/24 card

- GbE-1 card

- COM100/200 chassis

- Off air receivers i.e. ATSC-8

- EAS system

- Local content streamers i.e. PC

- Ethernet switch

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The COM2000 Head End

Front view of a COM360 with six COM46 Cards and QAMS

COM2000 HEAD END COMPONENTS

COM46

COM46-FLX

COM24

COM24-FLX

QAM6

COM360

ATSC-8

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A COM2000 HEAD END MAY INCLUDE

- COM46 cards
- COM46-FLX cards
- COM24 cards
- COM24-FLX cards
- QAM6 cards
- COM360 chassis
- Off air receivers i.e. ATSC-8
- EAS system
- Local content streamers i.e. PC
- Ethernet switch

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THE COM1000/COM2000 INSTALLATION

For troubleshooting purposes the COM1000/COM2000 installation can be split into three main sections.

- o The RF Plant

- o The Head End

- o The Distribution Network

Our first goal in troubleshooting the system is to determine which of these three areas the problem most likely resides in.

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THE RF PLANT

All COM1000/COM2000 RF plants should be designed and installed following the practices outlined in the latest version of this DIRECTV document or the current replacement wherever possible.

**DIRECTV D2 Advantage™
Signal Distribution System
Installation Specifications and Guidelines**

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THE RF PLANT

The COM46 card has 9 tuners and is SWM ONLY, NO multiswitch RF plants can be used with the COM46 card

This means that every COM46 card requires a complete SWiM 8 tap exclusively

When adding COM46 cards in existing COM1000 systems with COM24 and/or COM24-FLX cards the rules and guidelines in the DIRECTV **COM24/SWiM Use Cases and Installation Constraints** document and the Technicolor **COM24 and COM24-FLX Application Note 03132013** documents should be followed at all times

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RF PLANT COMPONENTS

The RF plant may include some or all of the following components:

- The Dish/LNB and mount

- Polarity locker/LNB power supply

- Leveling amplifier

- SWM module and power supply

- Multi-switch panel and power supply

- B Band converters

- RF Splitters

- Various cabling and connectors

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P.S. – YOUR PROBLEM IS RF
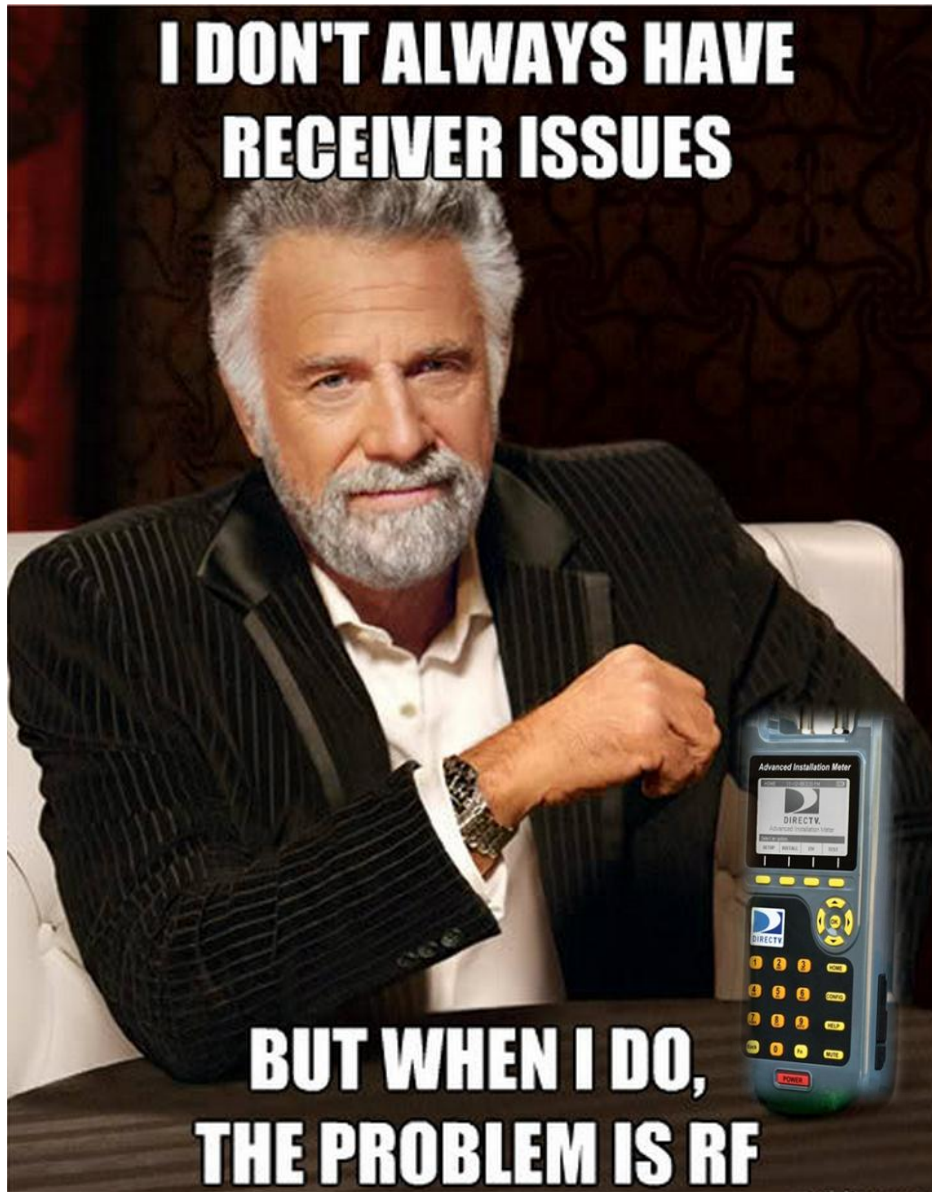
In 2010 - 2012 the number one system issue in the field investigated by Technicolor were RF plant related failures

A solid RF plant is critical to your success. It all starts with a good clean solid signal from the satellites

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CHECK THE SYSLOG

Mar 11 06:57:04 com24-10-5 syslog: HDXEA: 1

Mar 11 06:57:06 com24-10-5 syslog: HDXEA: 0

Mar 11 06:57:14 com24-10-5 syslog: a: MOcount(1,4421624)

Mar 11 06:57:17 com24-10-5 syslog: a: Status: RID=033081961030 CAM_ID=002299005104 Chassis=10 Slot=5 Temp=32,43 Fans=1,1 Power=2,1 Uptime=1187823 Auth=1 Paired=1 Tuners=6580964,9,-36; 3900930,3,-34; 0,14,-51

Mar 11 06:57:49 com24-10-5 syslog: a: MOcount(0,7897772)

Mar 11 06:58:03 com24-10-5 syslog: HDXEA: 1

Mar 11 06:58:03 com24-10-5 syslog: HDXEA: 0

A typical syslog for a properly functioning COM24 card with a good RF plant. Notice it contains only encryption key, marker object count and system status messages.

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CHECK THE SYSLOG

Mar 11 07:06:50 com24-10-5 syslog: a: MOcount(0,7901373)

Mar 11 07:07:03 com24-10-5 syslog: a: FilterPause(2, 2)

Mar 11 07:07:03 com24-10-5 syslog: a: Tuner(index=0, quality=0, strength=0, errors=0, event=32)

Mar 11 07:07:03 com24-10-5 syslog: a: Tuner(index=1, quality=0, strength=0, errors=0, event=32)

Mar 11 07:07:03 com24-10-5 syslog: a: FilterPause(2, 4)

Mar 11 07:07:03 com24-10-5 syslog: a: Tuner(index=2, quality=0, strength=0, errors=0, event=32)

Mar 11 07:07:03 com24-10-5 syslog: a: FilterPause(10, 14)

Mar 11 07:07:03 com24-10-5 syslog: a: FilterPaused

Mar 11 07:07:03 com24-10-5 syslog: a: CC errors index=0 CCtotal=32

Mar 11 07:07:03 com24-10-5 syslog: a: CC errors index=1 CCtotal=756

Mar 11 07:07:04 com24-10-5 syslog: a: No packets(0, 1)

Mar 11 07:07:04 com24-10-5 syslog: a: No packets(1, 1)

A syslog for a malfunctioning COM24 card with RF plant issues. Notice it contains messages indicative of signal issues.

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CHECK THE SYSLOG

Mar 11 07:22:04 buildroot user.notice syslog: a: MOcount(9228,9225,461,9220,9216,9212,9211,9208)

Mar 11 07:22:04 buildroot user.crit syslog: NDS.CDI HDXEA completed: 6

Mar 11 07:22:04 buildroot user.crit syslog: NDS.CDI HDXEA completed: 3

Mar 11 07:22:04 buildroot user.crit syslog: NDS.CDI DESC HDX_SetDescrambler:
DEMUX_DESCRAMBLER_SET_CONTROL_WORD, fd=102, index=13, x_con=6, stream_pid=4144,rv=0

Mar 11 07:22:04 buildroot user.crit syslog: NDS.CDI DESC HDX_SetDescrambler:
DEMUX_DESCRAMBLER_SET_CONTROL_WORD, fd=101, index=12, x_con=6, stream_pid=4146,rv=0

Mar 11 07:22:24 buildroot user.notice syslog: a: Status: RID=036624337402 CAM_ID=003805104894
Chassis=6 Slot=3 Temp=52 Fans=1,1 Uptime=664579 Auth=1 Paired=1 Tuners=3900943,8,-24;
3900971,14,-23; 3365432,15,-25; 5601806,8,-27; 3900936,10,-23; 4728190,10,-19; 3900952,11,-20

Mar 11 07:22:42 buildroot user.crit syslog: NDS.CDI HDXEA completed: 2

A typical syslog for a properly functioning COM46 card with a good RF plant. Notice it contains only encryption key, marker object count and system status messages.

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CHECK THE SYSLOG

Mar 11 06:57:07 buildroot user.notice syslog: a: CC errors index=0 CCtotal=12

Mar 11 06:57:07 buildroot user.notice syslog: a: CC errors index=1 CCtotal=2

Mar 11 06:57:07 buildroot user.notice syslog: a: CC errors index=2 CCtotal=151

Mar 11 06:57:07 buildroot user.notice syslog: a: CC errors index=6 CCtotal=7

Mar 11 06:57:07 buildroot user.notice syslog: a: CC errors index=7 CCtotal=55

Mar 11 06:57:08 buildroot user.err syslog: a: >>> Tuner(0) Lost Lock <<<

Mar 11 06:57:08 buildroot user.err syslog: a: >>> Tuner(2) Lost Lock <<<

Mar 11 06:57:08 buildroot user.err syslog: a: >>> Tuner(8) Lost Lock <<<

Mar 11 06:57:08 buildroot user.notice syslog: a: No packets(0, 1)

Mar 11 06:57:08 buildroot user.notice syslog: a: No packets(1, 1)

Mar 11 06:57:08 buildroot user.notice syslog: a: No packets(6, 1)

Mar 11 06:57:08 buildroot user.notice syslog: a: No packets(7, 1)

A syslog for a malfunctioning COM46 card with RF plant issues.
Notice it contains messages indicative of signal issues.
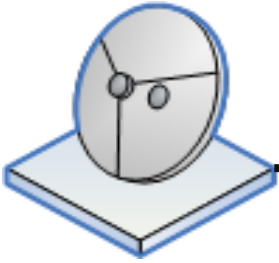
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TOOLS FOR TROUBLESHOOTING

The DIRECTV Advanced Installation Meter

This device should be used for all aspects of the installation, verification and troubleshooting of the RF plant
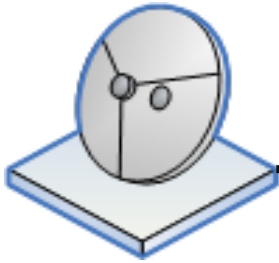
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VERIFICATION OF THE RF PLANT

When testing the RF plant connect the AIM to F connector on the cable feeding the COM24 card.
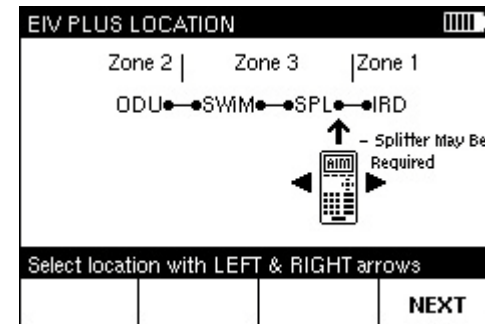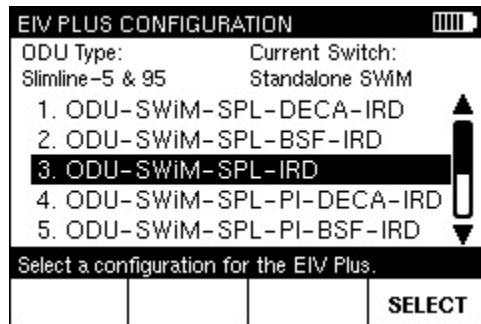
VERIFICATION OF THE RF PLANT

SWM RF Conditioning and Distribution

When testing the RF plant connect the AIM to F connector on the cable feeding the COM46 card.

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VERIFYING THE RF PLANT WITH THE AIM

Run the EIV Plus Test at the IRD to verify the signal to the COM46/COM24 card(s)

If there are ANY failures during this test consult the DIRECTV Appendix A - MDU/Commercial Advantage Validation and Troubleshooting Procedure to identify and correct the failure.

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TOOLS FOR TROUBLESHOOTING

A DCI401MCS and a small television monitor with RF and HDMI inputs make an ideal troubleshooting tool for an RF based distribution network

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VERIFICATION OF QAM OUTPUT

COM200 Chassis

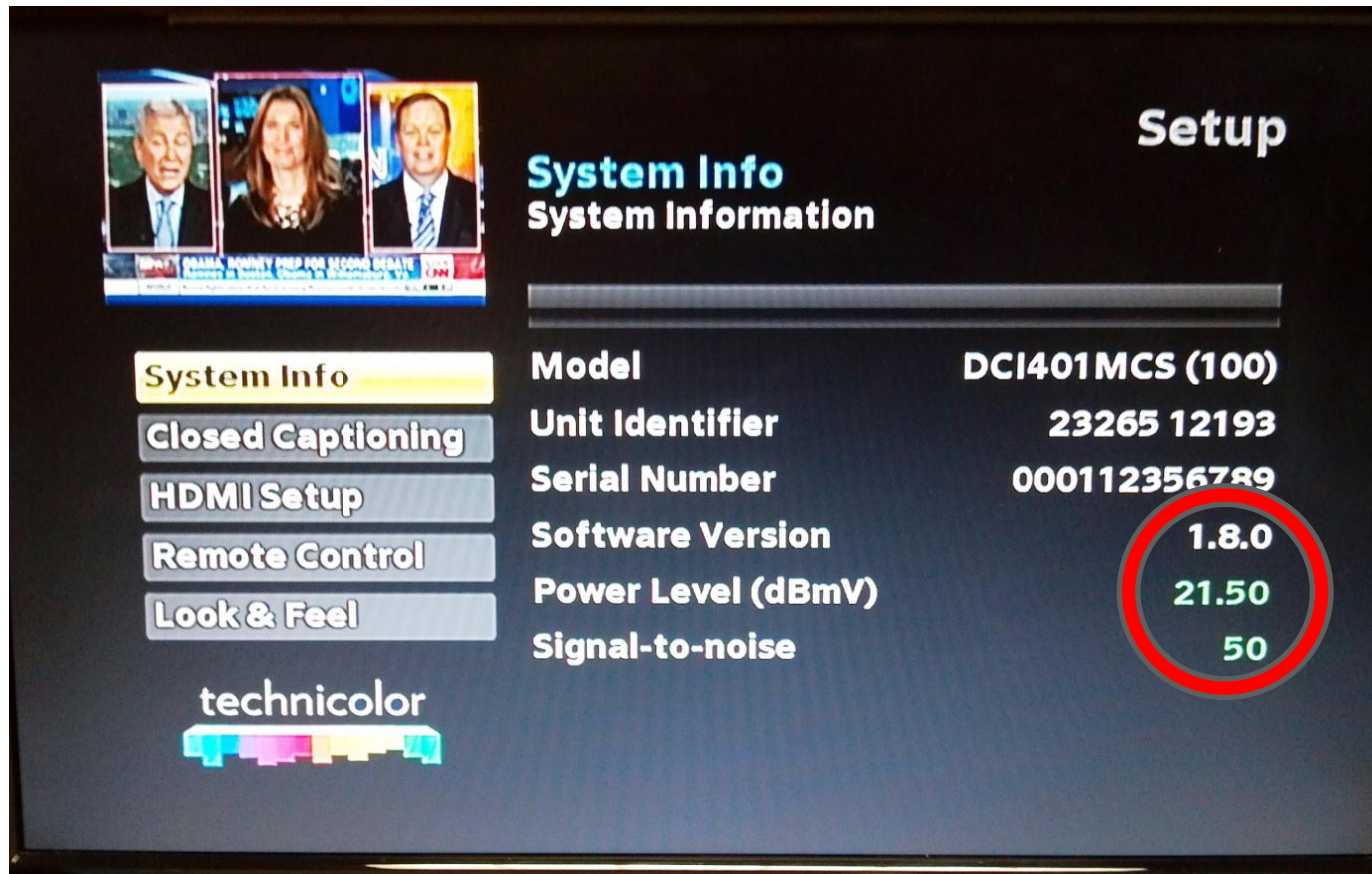The output of the QAM is checked at the F connector on the front of the QAM module
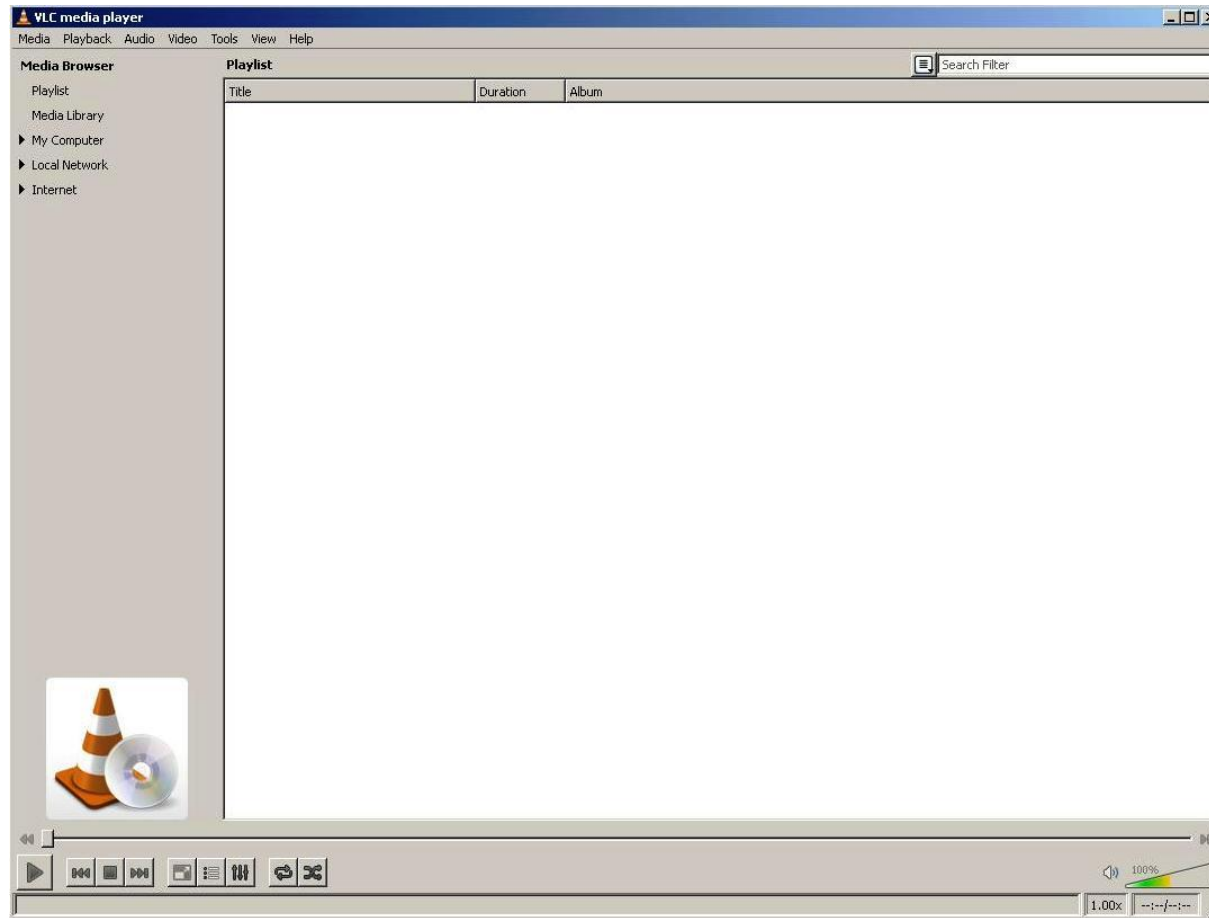
COM360 Chassis

The output of the QAM is checked at the F connector on the front of the QAM module(s)

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TOOLS FOR TROUBLESHOOTING

Important information about the strength and quality of the signal can be obtained by using the DCI401MCS menu and selecting Settings/System Info.
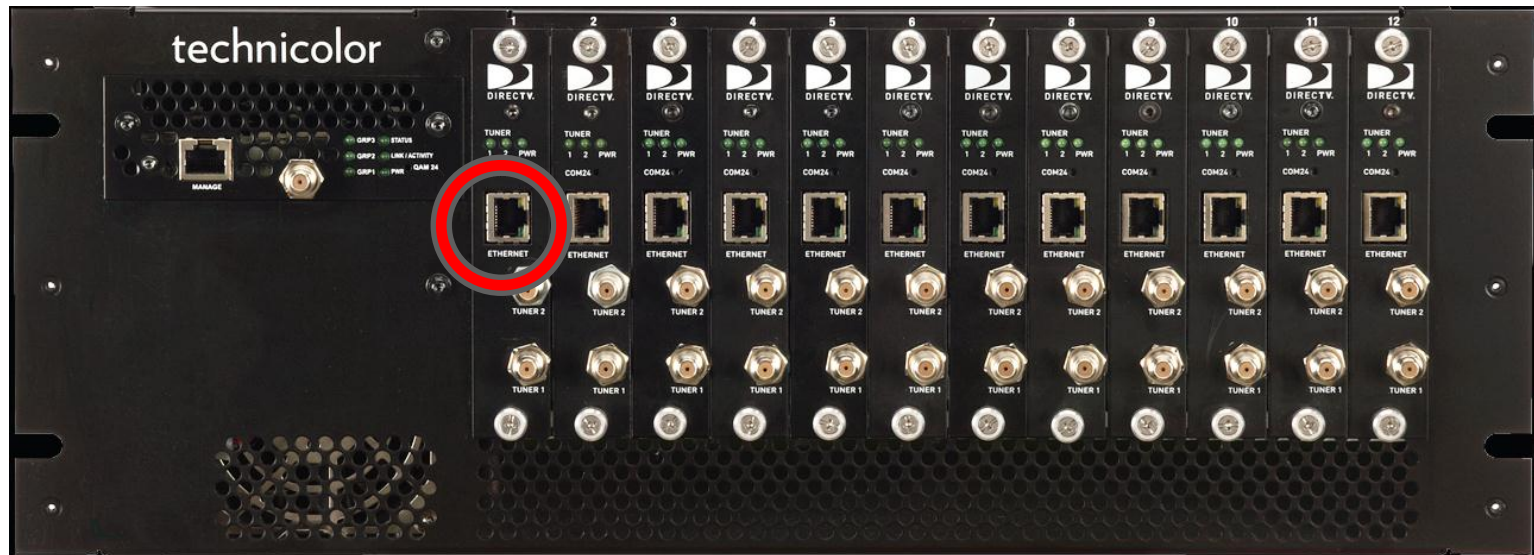
TOOLS FOR TROUBLESHOOTING

The VLC media player is an excellent tool for verification of an IP stream coming from a COM1000 system

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VERIFICATION OF IP OUTPUT

The IP output of a COM24 or COM24-FLX can be checked using the front Ethernet port. This requires you to connect the port and reset the card to make the front port active

VERIFICATION OF IP OUTPUT

The IP output of the chassis is verified at the Gigabit Ethernet connector located on the rear of the COM200 chassis

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VERIFICATION OF IP OUTPUT

The IP output of the chassis is verified on the Gigabit Ethernet connectors located on the front of the COM360 chassis

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VERIFICATION OF IP OUTPUT

Multicasting a Video Stream

The IPv4 multicast address range includes the addresses from 224.0.0.0 to 239.255.255.255

To IP multicast a channel on the simple tune page set the following:

Dest_IP_Address = 225.0.0.1

Dest_Port_Number = 123

Major_Number = 100

To play a multicast stream with VLC select the Media pull down then select Open Network Stream and enter UDP://@225.0.0.1:123

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VERIFICATION OF IP OUTPUT

Unicasting a Video Stream

The IPv4 private address ranges include:

10.0.0.0 to 10.255.255.255

172.16.0.0 to 172.31.255.255

192.168.0.0 to 192.168.255.255

To IP unicast a channel on the simple tune page set the following:

Dest_IP_Address = 10.0.0.1

Dest_Port_Number = 123

Major_Number = 100

To play a unicast stream with VLC select the Media pull down then select Open Network Stream and enter UDP://@10.0.0.1:123

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THE SIGNAL DISTRIBUTION NETWORK

The distribution network type could be:

- RF based (coax wiring)

- Z-Band (RF over cat5e or cat6 twisted pair)

- IP based (cat5e or equivalent wiring)

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THE SIGNAL DISTRIBUTION NETWORK

The components of the distribution network may include:

- Ethernet switches, routers, etc

- Combiners

- RF amplifiers

- Splitters

- Various cabling and connectors

- Pro:Idiom decryption device and/or set back boxes   i.e DCI401MCS, Enseo, etc.

- Television sets

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TELEVISIONS - THE GREY AREA

There are known issues with televisions that prevent them from working properly with the COM1000/COM2000 and the DIRECTV signal. Some of these issues are:

- No support for H.264 encoding at all

- No support for MPEG2 encoding at all

- No support for MPEG1 Layer II audio encoding

- No support for Pro:Idiom encryption

- Lip Sync issues

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OTHER INSTALLATION CONSIDERATIONS

- Incoming AC power

- System grounding

- Equipment room environment (temperature, humidity, dust, etc.)

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COM1000/COM2000 System Toolkit

Your COM1000/COM2000 troubleshooting toolkit should contain most if not all of the following:

- COM24mdns.exe

- Web browser - IE, Chrome, Firefox, Safari

- TFTP server - tftpd32

- DHCP server - tftpd32

- Syslog server - tfpd32, Kiwi Syslog Daemon

- IP video playback utility, VLC

- Packet Capture - Wireshark

- DCI401MCS

- Video monitor with HDMI input

- AIM

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IS THIS A TECHNICOLOR PROBLEM?

For a COM1000/COM2000 system Technicolor is responsible for the signal from the input F connector on the receiver cards (COM24, COM24-FLX, COM46, COM46-FLX) to the output F connector on the QAM(s) if present or the Gigabit Ethernet connector(s) if there is no QAM in the system.

In the case of the DCI401MCS Technicolor is responsible for the signal from the input F connector to the output F and HDMI connectors.

For the ATSC-8 Technicolor is responsible for the signal from the input F connectors to the Ethernet output connectors.

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WHAT IS NOT A TECHNICOLOR PROBLEM?

- Any part of the RF plant from the dish to the COM1000/COM2000 system

- Any part of the management network including any PC, switch, router, etc.

- Any part of the RF distribution network from the COM1000/COM2000 system

- Any part of the network in an IP distribution from the COM1000/COM2000 system

- Any part of the network in a Z band distribution from the COM1000/COM2000 system

- Televisions and television related issues

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The Path for Escalating Problem Resolution
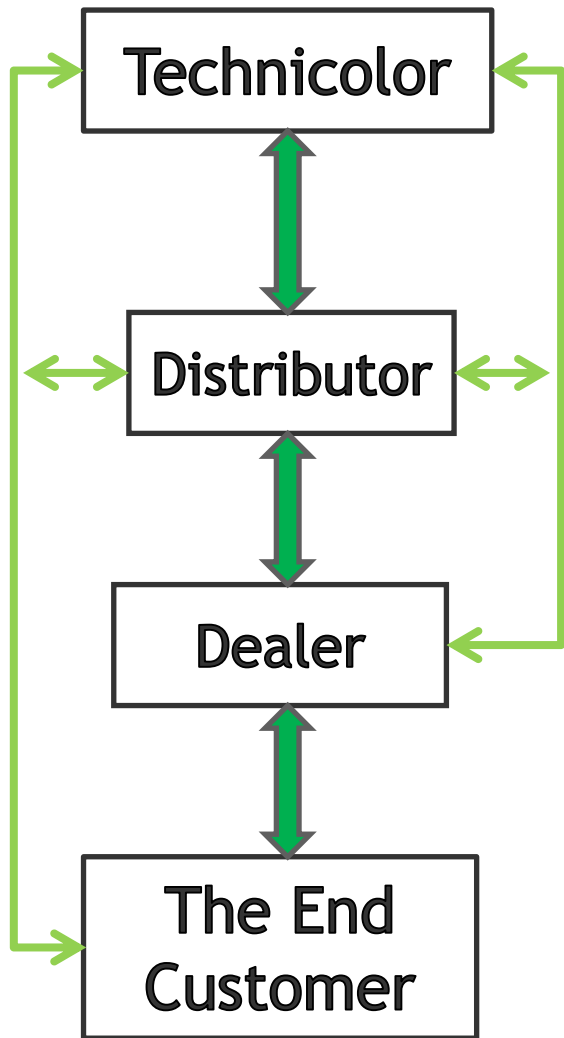
Technicolor ↕ **Distributor** ↕ **Dealer** ↕ **The End Customer**	It is requested that all calls to Technicolor for support with the COM1000/COM2000 systems originate from the distributors.

Technicolor will interface directly with dealers or end customers as required but prefers distributor involvement whenever possible. |

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Contacting Technicolor MCS

The Technicolor MCS website:

http://www.technicolor.com/en/solutions-services/connected-home/commercial-video-solutions

The Technicolor MCS toll free support number:

1-855-297-5820

The Technicolor MCS email address:

mcssales@technicolor.com

Email to: Mark.Anderson2@technicolor.com

Telephone 317-587-5081

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Before Escalating Problems to Technicolor

In order for Technicolor to understand and help you resolve customer field issues in a timely manner, we must have good information to understand the system configuration and the problem being described. Prior to contacting Technicolor you should be sure that the system is running the latest QAM and COM software versions **(you will be asked).**

This information MUST come from the field. Technicolor generally has no working knowledge of any particular configuration or system location.

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Thank You