Quasonix

ISO 9001:2015
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Technical Guide

RDMS™ Access via Telnet

and

Serial Control Protocol

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West Chester, OH 45069
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****Note: Access to this serial control interface is provided primarily for debugging purposes. Unlike the standard browser interface, the serial control interface within the Telnet screen is not safeguarded from accidental or improper changes to the receiver's configuration.**

It is strongly recommended that users contact Quasonix Technical Support (Tel: 513-942-1287 or support@quasonix.com) prior to using the Terminal serial control interface.

Specifications subject to change without notice.

All Quasonix receiver products are under U.S. Department of Commerce jurisdiction categorized as 5A991; not covered by ITAR

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1 Access via Telnet

Telnet provides access to the individual receiver channel's underlying serial control interface. The serial control interface is not recommended for typical RDMS usage. The Telnet interface should only be accessed by advanced users. Contact Quasonix customer support before using these options.

Note: Access to this serial control interface is provided primarily for debugging purposes. Unlike the standard browser interface, the serial control interface within the Telnet screen is not safeguarded from accidental or improper changes to the receiver's configuration.

It is strongly recommended that users contact Quasonix Technical Support (Tel: 513-942-1287) prior to using the Terminal serial control interface.

1. In a command window, type: telnet open {IP address of the receiver to connect to} 8888.
2. Press the Enter key on the keyboard.

Figure 1: Telnet Into Terminal

The next screen (Figure 2) shows the RDMS channel subscribed to by Telnet.

Method 1-Use the Subscribed Channel

3. At this point, the user may ignore the instructions on the screen and press the Enter key again.

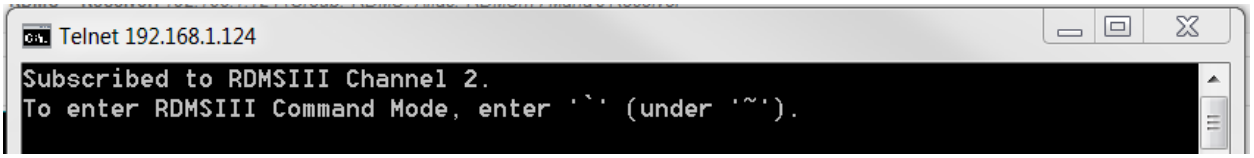

Figure 2: Channel Subscribed

The command prompt for the mode in the subscribed channel displays immediately, as shown in Figure 3. This is a portal to the receiver's serial control interface and allows the user to communicate to the individual receiver "brick" using its basic command protocol.

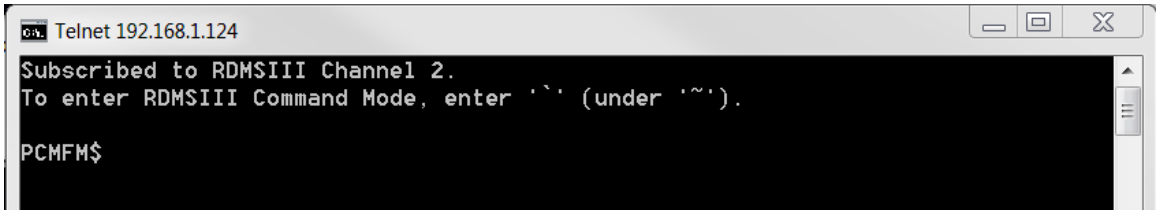

Figure 3: Connected to Channel 2 in PCM/FM Mode

Method 2-Unsubscribe and use a different channel

Look at the second Telnet screen again (Figure 4).

4. Follow the on-screen instruction and press the ` key. This is the very first key on the left side of the keyboard under the tilde (~).

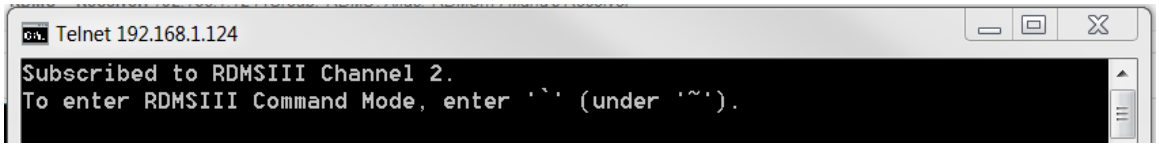

Figure 4: Channel Subscribed-Method 2

5. The RDMSIII Telnet Command Menu is shown in Figure 5.

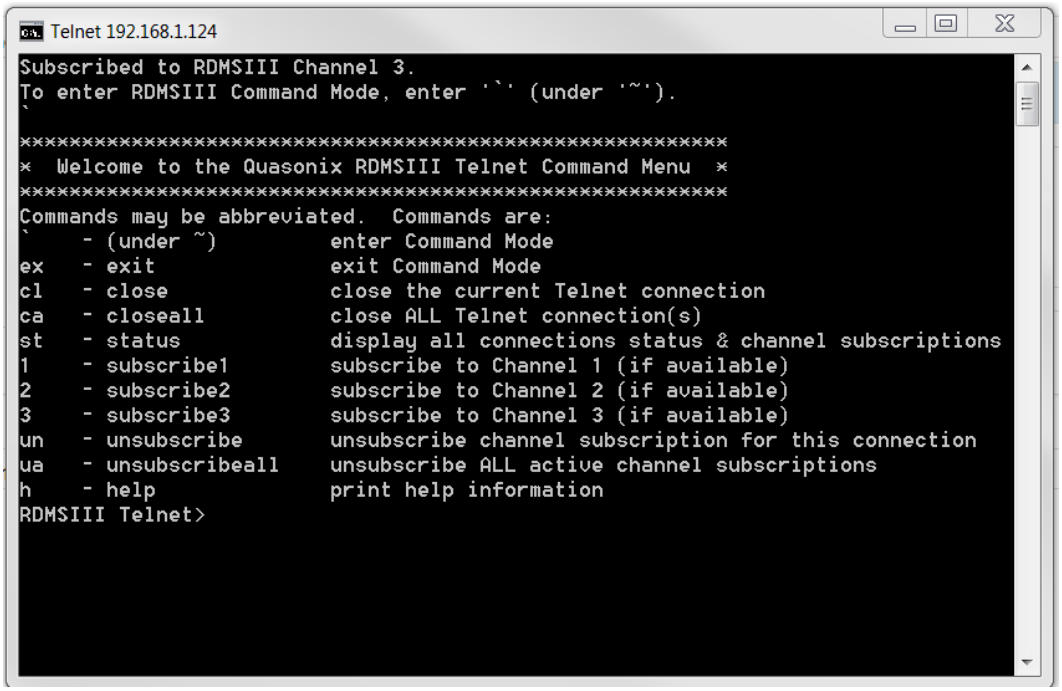

Figure 5: RDMSIII Telnet Command Menu

The command menu is used to unsubscribe from connections and reconnect to a specific channel. Figure 6 shows all connections being unsubscribed.

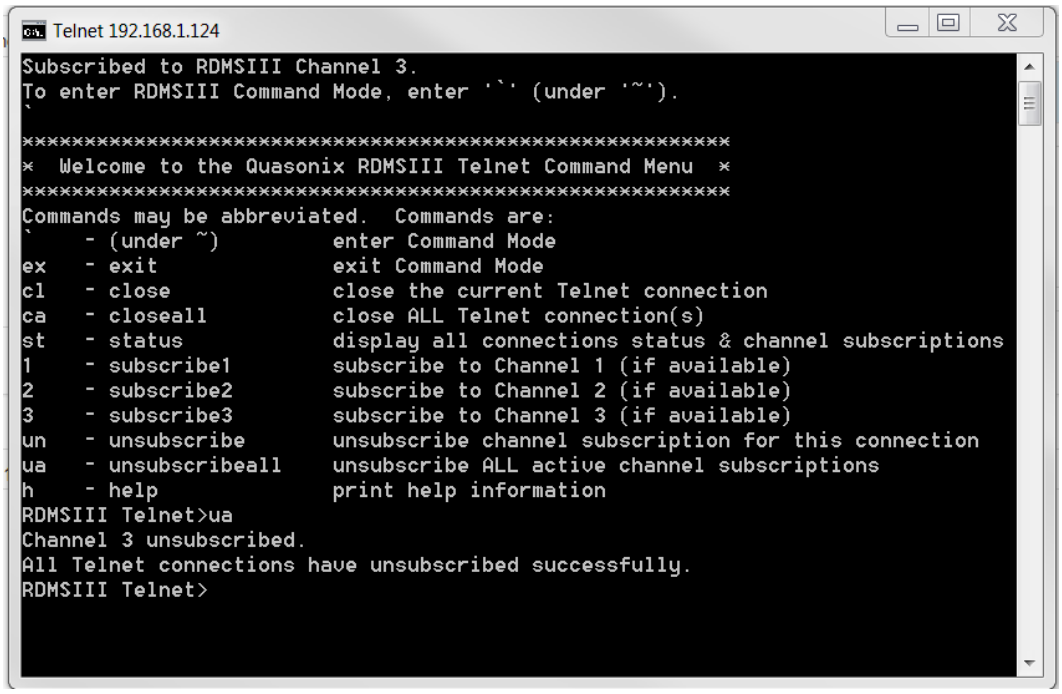

Figure 6: RDMSIII Telnet Command Menu-Unsubscribe All Channels

In Figure 7, the user typed a 1 to subscribe (connect) to channel 1. At this point, the user may press the Enter key to continue, as described in Method 1.

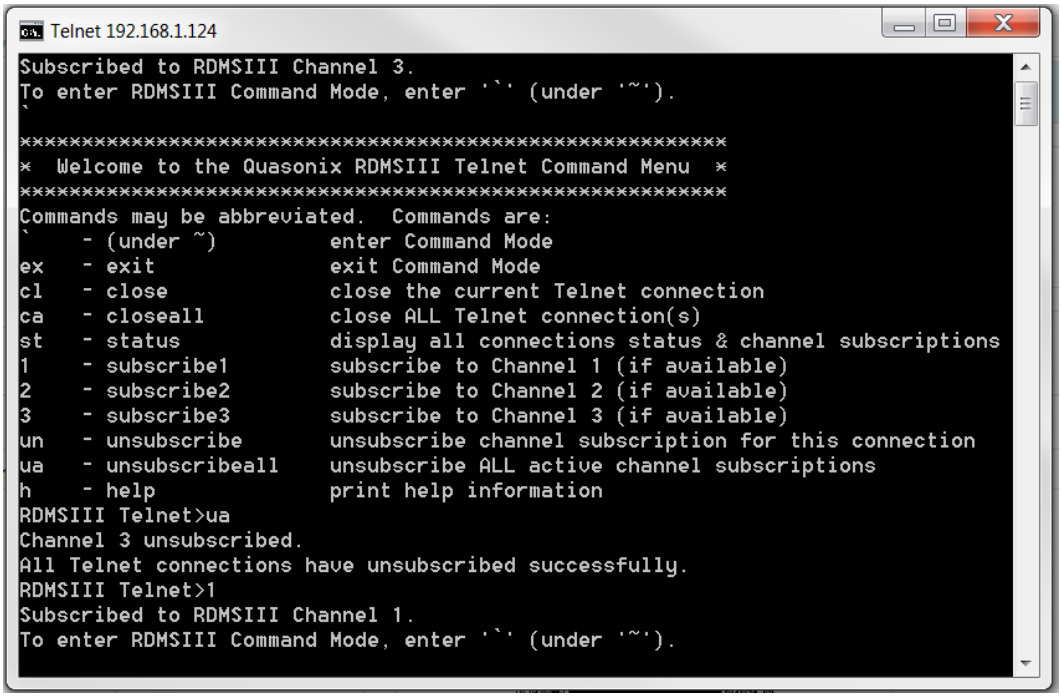

Figure 7: RDMSIII Telnet Command Menu-Subscribe to a Specific Channel

All Quasonix serial commands are alphabetic characters, followed by 0, 1, or 2 arguments. If the command is issued with arguments, there must be a space after the alphabetic characters. The commands are not case sensitive.

All commands generate a response of one or more lines. The length of the response depends on the verbosity level. The last response line is always the currently selected mode (PCMFM, SOQPSK, CPM, or PSK), followed by the character "+" or ">", depending on the version of the firmware. This prompt signifies that the RDMS™ is ready to accept new characters.

A complete list of available serial commands can be found in section 2 or by typing HA.

2 RDMS™ Serial Control Protocol

The RDMS is controlled via a simple three-wire serial interface (transmit, receive, and ground). Configure your controller's serial port to the following settings:

- Baud rate of 115,200
- 8 bits
- No parity
- 1 stop bit

For setup and configuration via a standard Windows-based PC, Quasonix recommends the application called *Terminal*, a flexible, full-featured control interface that is included in the RDMS Product CD. Otherwise, one can use other terminal emulators, such as PuTTY or TeraTerm.

When power is applied to the receiver, a welcome message, shown in Figure 5, displays. After the welcome message, the mode status displays (in this example, PCM/FM). This varies depending on the modes and versions loaded into the RDMS. Additional status information about RDMS initialization displays last. This also varies depending on RDMS settings and options.

```
Quasonix, Inc
6025 Schumacher Park Dr
West Chester, OH 45069
(513) 942-1287
www.quasonix.com
CAGE CODE: 3CJA9
IRIG-106 Release 07

PCMFM App Rev: 1.0.10.166 Dec  3 2015 09:42:16
PCMFM FPGA Rev: 0000102E  Nov 12 2015 02:34:51

AGC tables loaded
RF attenuator calibration loaded
IF attenuator calibration loaded
Gain calibration data loaded
RF filter tune data loaded
Synthesizer data loaded
Saved parameters DEFAULTED
Warm start>
```

Figure 8: RDMS™ Welcome Message Example

The base command syntax is "a command followed by zero or more command parameters." If the command is issued with arguments, there must be a space after the alphabetic characters. The commands are not case sensitive.

All commands generate a response of one or more lines. The length of the response depends on the verbosity level. The last response line is always the currently selected mode (PCM/FM, SOQPSK, CPM, or PSK), followed by the character "+" or ">", depending on the version of the firmware. This prompt signifies that the RDMS is ready to accept new characters.

2.1 Tier 0 (PCM/FM), Tier I (SOQPSK-TG), Tier II (Multi-h CPM) and PSK Commands

The following table describes all receiver user commands. Listed are the command code, name, description of the command, whether specific options must be ordered or the command is standard on all receivers, basic or advanced command, and whether the command is restricted to specific waveform modes.

Multiple commands may be typed on a command line if they are separated by a semicolon ";". There is a limit of 256 characters per command line, including semicolons. Commands with no parameters request status only.

Refer to command HA in section 2.1.1.25 for specific help in reading the command sets.

Refer to section 2.1.1 for additional command set detail and examples. This information is also available in the command Help.

For example:

PCM/FM>FR 2200.5; BR 6.000; AGC

results in the following:

Frequency set to 2200.5 MHz

Bit Rate set to 6.000 Mbps

and status for all AGC parameters are displayed as:

AGC control enabled

AGC control mode RF

AGC automatic mode select enabled

AGC zero mode Auto

AGC zeroed at -110.22 dBm (13.38 dB attenuation)

AGC auto zero hold threshold 0.000 dB

AGC auto zero time constant 0.250 seconds

AGC loop total power 13.375 dB

Bulk attenuator AGC control enabled, switched out

Ctrl Y repeats the command sequence without having to retype the commands.

Table 1: Standard and Optional User Commands

Mnemonic	Name	Description	Option (s) Required	Mode Restriction
?	Help Message	Displays abbreviated list of available Help commands	Standard	None
ACU	Antenna Control Unit	Report or set antenna control unit automatic gain control (AGC) settings	-37	None
AEQ	Adaptive Equalizer	Report equalizer status and control adaptive equalizer settings	-EQ	None
AFC	Automatic Frequency Control	Report or set a variety of automatic frequency control parameters	Standard	None
AGC	Automatic Gain Control	Reports or set a variety of AGC parameters	Standard	None
AHM	Analog High Speed Mixer	Displays and controls high speed (video) output mixer settings	-37	None
AHO	Analog High Speed Output (Tape Output)	Displays and controls high speed (video) output settings	-37	None
ALM	Analog Low Speed Mixer	Displays and controls low speed (video) output mixer settings	-37	None
ALO	Analog Low Speed Output	Displays and controls low speed (ACU) output settings	-37	None
AL	Lock Status Command	Reports system lock status	Standard	None
BCS	Best Channel Selector	Displays and controls best channel selector settings	Standard	None
BER	Bit Error Rate	For Bit Error Rate commands and information, refer to Appendix A, Bit Error Rate Testing	Standard	None
BR	Bit Rate	Report or set baseband bit rate	Standard	For Asynch PSK (legacy) modes, BR A and BR B must be specified separately
CLH	Command Line History	Reports last 25 commands issued	Standard	None

Mnemonic	Name	Description	Option (s) Required	Mode Restriction
CMB	Combiner Control	Displays and controls combiner settings	Standard	None
CP	Clock Polarity	Report or set clock polarity inversion state	Standard	For Asynch PSK (legacy) modes, CP A and CP B must be specified separately
DA	Downconverting Antenna	Displays and controls receiver C band to P band downconverting antenna	P band enabled receiver	None
DD	Differential Decoding	Enable or disable differential decoding	Standard	SOQPSK
DHI	High Speed Digital Input	Displays and controls high speed digital input settings	Standard	None
DHO	High Speed Digital Output	Displays and controls high speed digital output settings	Standard	None
DLI	Low Speed Digital Input	Displays and controls low speed digital input settings	Standard	None
DLO	Low Speed Digital Output	Displays and controls low speed digital output settings	Standard	None
DOM	Digital Output Muting	Control shut down of clock and data outputs	Standard	None
DP	Data Polarity	Report or set data polarity inversion state	Standard	For Asynch PSK (legacy) modes, DP A and DP B must be specified separately
DQ	Data Quality Encapsulation and Metrics	Display and control data quality encapsulation and DQ metrics	Standard	ARTM modes
DR	Derandomizer State	Report or set the derandomizer state	Standard	None
DSO	Digital Status Output	Controls the source, polarity, and override states	Standard	None
FEC	Forward Error Correction Mode	Report FEC status for enabled modes	-K7	Legacy PSK
FL	Force Lock Indication	Diagnostic tool to force the system to indicate locked or unlocked	Standard	None

Mnemonic	Name	Description	Option (s) Required	Mode Restriction
FM	FM Demodulator Settings	Displays and controls FM demodulator settings	Standard	PCM/FM
FR	Frequency	Report or set receiver center frequency	Standard	None
HA	Advanced Help Command	Displays Help commands not frequently used or with more complex construction than the basic two character Help commands	Standard	None
HT	HyperTrack	Displays and controls HyperTrack settings	Standard	None
IF	IF Filter Control	Display and control IF filter settings	Standard	None
LDPC	Low Density Parity Check	Display and control Forward Error Correction settings	Standard	SOQPSKLDPC or STCLDPC
MI	Modulation Index	Report or Set Modulation Index Tracking or Acquire	Standard	PCM/FM
MO	Modulation	Report or set modulation setting	Standard	Limited to modes installed
OCM	Output Clock Measurement	Displays measured output clock frequency	Standard	None
PDC	PCM Decoding	Controls digital decoding such as NRZ-L, NRZ-M, and bi-phase	Standard	None
PDF	PCM Deframing	Displays and controls PCM deframing settings	Standard	None
PER	Parameters Erase	Erases the stored parameter set for the current mode; Upon power cycle, resets current operating parameter set to factory default values	Standard	None
PERA	All Parameters Erase	Reset all modes to factory default values	Standard	None
PL	Input Power Level	Reports or sets the current input power level setting	Standard	None
PLD	Parameters Load	Loads the stored parameter set into the current operating parameter set	Standard	None
PNC	Phase Noise Compensation	Report or set phase noise compensation state	Standard	PCM/FM

Mnemonic	Name	Description	Option (s) Required	Mode Restriction
PRS	Reset Defaults	Restores factory default parameters for the unit Default is currently the lowest number modulation supported by the transmitter with the selected band and frequency limits	Standard	None
PSV	Parameters Save	Writes the current operating parameter set into a (previously erased) stored parameter set	Standard	None
QT	Query Temperature	Report the temperature in degrees Celsius	Standard	None
RFD	Reset Defaults	Reset all parameters to factory default values Erases all parameter data Resets to default Mode	Standard	None
SDI	Signal Degradation Information	Sets signal degradation information enable or disable parameters	Standard	SOQPSK
SI	Spectrum Inversion	Accounts for downconverting antenna spectral inversion	Standard	None
SN	Show Serial Number	Report the serial number for the unit	Standard	None
SV	Save Parameters	Saves the current parameters in non-volatile memory, including frequency, modulation, bit rate, data polarity, clock polarity, AGC state, verbosity level, etc.	Standard	None
SYS	System Status Tracking	Displays the system status of the receiver	Standard	None
TO	Tape Out	Displays and controls tape output settings	Standard	None
TOD	Time of Day	Sets the current calendar date and time of day	Standard	None
UP	Show Options	Displays the current hardware configuration and options on the receiver	Standard	None

Mnemonic	Name	Description	Option (s) Required	Mode Restriction
VE	Version	Report the current Firmware (software) version information for the receiver; displays the current application, FPGA, and adaptive equalizer versions	Standard	None

2.1.1 Additional Command Set Details

2.1.1.1 Commands Used with AQPSK or AUQPSK Modes

The commands detailed below generally operate on a single data stream. AQPSK and AUQPSK modulation, however, contain two data streams that require different bit rate settings and may require other independent settings. As a result, when using AQPSK or AUQPSK modes, some command components require a datapath parameter to distinguish which stream is being configured. These commands include: Best Channel Selector (BCS), Clock and Data Polarity (CP, DP), Derandomizer (DR), Data Quality (DQ), Forward Error Correction (FEC), and PCM Decoding (PDC).

Refer to the receiver Help for the syntax specific to each command.

For example:

BCS *in* AQPSK mode

Displays and controls best channel selector settings

BCS [<d><e>] – Sets best channel selection enable for data <d> to <e>

where:

<d> - Datapath component

A – Data A

B – Data B

<e> - Enable

0 – Disabled

1 – Enabled

All of the commands follow a similar pattern, however, **not all components of a particular command contain the datapath parameter**. In the following BCS example, the BCS Source controls the enables for both BCS channels:

BCS [S<s><e>] - Sets best channel selector source <s> enable to <e>

where:

<s> Sources

CH0 – Channel 0

CH1 – Channel 1

INT – Internal

where:

<e> Enable

0 – Disabled

1 – Enabled

BCS *NOT in* AQPSK mode

Displays and controls best channel selector settings

BCS [<e>] – Sets best channel selection enable for data <e>

where:

<e> - Enable

0 – Disabled

1 – Enabled

2.1.1.2 Antenna Control Unit - ACU

The ACU command displays and controls the antenna control unit settings.

ACU [M <m>|C <e>|O <s>]

M <m> - Sets antenna control mode to <m>

where: <m> - Control mode

M - AGC time constant and AM bandwidth set manually

S - AGC time constant and AM bandwidth set based on antenna scan

C <e> - Sets AGC compensated AM enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

O <s> - Sets antenna control output to <s>

where: <s> - Signal source

0 - Channel 0

1 - Channel 1

C - Combiner

ACU [S [T <t>|R <r>]] - Antenna scan settings

T <t> - Sets antenna mode scan type to <t>

where: <t> - Scan type

C - Conical scan

E - E-scan

R <r> - Sets antenna mode scan rate to <r>, 10.00 to 50.00 Hz

ACU [AM [<p>|S <s>|B <b>]] - Antenna control unit AM settings

<p> - Sets AM output polarity to <p>

where: <p> - Polarity

{0|+} - Normal

{1|-} - Inverted

S <s> - Sets AM output scale to <s>, -128.0 to 128.0

B <b> - Sets manual mode AM detector bandwidth to <b>, 5.00 to 50000.00 Hz

ACU [AGC [<p>|S <s>|T <n>]] - Antenna control unit AGC settings

<p> - Sets AGC output polarity to <p>

where: <p> - Polarity

{0|+} - Normal

{1|-} - Inverted

S <s> - Sets AGC output scale to <s>, 1.0 to 50.0 dB/V

T <n> - Sets manual mode AGC time constant to <n>, 0.1 to 1000.0 ms

Examples:

ACU Report ACU related status
PCMFM$acu
ACU mode manual
AGC compensated AM on
Antenna scan type conical
Antenna scan rate 30.0 Hz
Manual AM bandwidth 100.0 Hz
Manual AGC time constant 100.0 ms
AM output polarity +
AGC output polarity +
AGC output scale 10.0 dB/V
AM scale 1.0

ACU AGC 0 Set polarity to Normal
ACU AGC 1 Set polarity to Inverted
ACU AGC S 42.0 Set AGC output scale to 42.0 dB/V
Valid range is 1.0 to 50.0 dB/V
ACU AGC T 222.0 Set manual mode AGC time constant to 222.0 ms
Valid range is 0.1 to 1000.0 ms

2.1.1.3 Adaptive Equalizer Control - AEQ

The AEQ command displays and controls adaptive equalizer settings.

AEQ [<e>| H {E|Q}|HE<t>|HQ <t>|HD <t>]

<e> - Sets adaptive equalizer enable to <e>

where: <e> - Enable

0 – Disabled

1 – Enabled

AEQ H <e> - Sets equalizer auto hold enable to <e>

<e> - Sets adaptive equalizer enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

H E – Sets equalizer hold reference to Eb/N0

H Q – Sets equalizer hold reference to DQM BEP

HE <t> - Sets EQ hold below Eb/N0 <t>, -20.000 to 30.000 dB or -100.000 is Off

HQ <t> - Sets EQ hold below DQM BEP <t>, 1.00042e-12 to 0.5 or 1.0 is Off

HD <t> - Sets EQ hold/run delay <t>, 10 to 60000 ms or 0 is Off

AEQ T [<e> [-h][<f>][<r>]] - Sets equalizer tracking display enable to <e> in format <f> at rate <r>

where: <e> - Enable

0 - Disabled

1 - Enabled

<f> - Format (last used, if not specified)

N - Normal

C - CSV

<r> - Display rate <r>, 100 to 60000 ms (500 ms if not specified)

Options:

-h - Do not display header

AEQ [M {CMA|DD} <k>]

M CMA <k> - Sets EQ CMA Mu to <k>, 0.000 to 0.003906

M DD <k> - Sets EQ CMA Mu to <k>, 0.000 to 0.003906

AEQ [K {FF|FB} <k>]

K FF <k> - Sets EQ feed forward proportional constant to <k>, 0.000 to 0.999985

K FB <k> - Sets EQ feedback proportional constant to <k>, 0.000 to 0.999985

AEQ [MT {CMA|DD} <t>]

MT CMA <k> - Sets CMA MSE threshold to <k>, 0.000 to 0.999985

MT DD <k> - Sets DD MSE threshold to <k>, 0.000 to 0.999985

AEQ [CT <t>] - Sets confidence threshold to <t>, 0.000 to 3.999939

AEQ [AR <e>|C <e>|R <r>|DD <e>]

AR <e> - Sets auto reset enable to <e>

C <e> - Sets power centering enable to <e>

R <e> - Sets reset <r>

where: <r> - Reset

0 - Run

1 - Reset

DD <e> - Sets decision directed enable to <e>

where: <e> - Enable

0 - Disabled

1 – Enabled

AEQ TAPS [DFT][<f>][<o>] - Display equalizer source <s> in format <f> with options <o>

where: <f> - Format

N - Display using normal format - default

C - Display using CSV format

where: <o> - Options

IQ - Display complex values using CSV format - default

POL - Display polar values using CSV format

G - Display as graphic only

Examples:

AEQ Report equalizer status
PCMFM$aeq
Adaptive equalizer enabled
EQ auto hold disabled
Decision directed error is NOT in use
Decision directed enabled
Reg enabled
Mean squared error (CMA) 0.014893
Mean squared error (DD) 0.855225
Average confidence 0.040588

Equalizer filters not reset
Equalizer IS in auto reset
Auto reset enabled

AEQ 0 Disable adaptive equalizer
AEQ 1 Enable adaptive equalizer
AEQ H x Set equalizer hold below Eb/N0 to a value between -20.000 and 30.000 dB;
-100.000 sets equalizer hold to Off
AEQ T 0 Disable equalizer information tracking display
AEQ T 1 Enable equalizer information tracking display

2.1.1.4 Automatic Frequency Control - AFC

The Automatic Frequency Control command reports or sets various AFC parameters.

AFC [M <m>|H <t>|C {A|<c>}|L <m>|T {L|H} <t>|R <e> or AFC SYS <d>

M <m> - Sets AFC mode to <m>

where: <m> - mode

O - Off

H - Hold

T - Track

A - Acquire

H <t> - Sets AFC hold below Eb/N0 <t>, -20.000 to 30.000 dB or -100.000 is off

C A - Sets AFC coefficient to be automatically set based on bit rate

C <c> - Sets AFC coefficient to <c>, 0.0003511 to 46.018 seconds

L <m> - Sets AFC correction limit to <m>, 0.000006 to 46.666661 MHz

T L <t> - Sets AFC power detect low threshold to <m>, 0.000000 to 0.999985

T H <t> - Sets AFC power detect high threshold to <m>, 1.000015 to 65536.000000

O <e> - Sets AFC data path override enable to <e>

where: <e> - enable

0 - Disabled

1 - Enabled

SYS <d> - Sets the AFC status tracking display mode to <d>

where: <d> - display mode

D - Detected

C - Compensated

The Sys d setting is used to change whether detected or compensated offset is displayed in the SYS output

AFC C - Sets the automatic frequency control coefficient

Examples:

AFC C A	Set AFC coefficient to be automatically set based on bit rate
AFC C 0.00001	Set AFC coefficient to 0.00001 seconds (ten times slower tracking than default) Valid range is 4.389e-05 to 5.752 seconds

AFC H - Sets the automatic frequency control hold threshold below Eb/N0

Example:

AFC H 6.000	Set AFC to automatically hold tracking below 6.000 dB E_b/N_0 Valid range is -20.000 dB to 30.000 dB; -100.000 dB is Off

AFC L - Sets the automatic frequency control correction limit

Example:

AFC L 42.123456	Set AFC correction limit to 42.123456 MHz Valid range is 0.000006 to 46.666661 MHz

AFC M - Sets the automatic frequency control mode

Examples:

AFC M O	Set AFC to Off
AFC M H	Set AFC to Hold
AFC M T	Set AFC to Track
AFC M A	Set AFC to Auto

AFC P <p> – Sets the automatic frequency control hold period

Example:

AFC P 5007 Set AFC hold period to 5007 µs
Valid range is 0.000 to 4294967296.000 µs; initialized value is 5000 µs

AFC T - Sets the automatic frequency control power detect threshold

Example:

AF T 0.0000 Set AFC to power detect threshold to 0.000
Valid range is 0.000 to 1.000

Example:

AFC

AFC auto operation mode Off
AFC tracking auto hold below 10.00000 dB Eb/N0
Compensated frequency offset -0.004606 MHz
Detected frequency offset -0.004718 MHz
Duty cycle 0.08 %
Auto AFC bandwidth is enabled
AFC coefficient 0.03573 seconds
AFC limit 0.50000 MHz
AFC power threshold 0.000

2.1.1.5 Automatic Gain Control - AGC

The Automatic Gain Control command reports and sets a variety of AGC parameters. Additional AGC commands are described in separate subsections 2.1.1.5.1 through 2.1.1.5.7. A detailed explanation of AGC Compensation is located in **Error! Reference source not found.**.

AGC [-V] - Shows advanced AGC status

AGC [<e>] - Sets the AGC enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

Example:

AGC (shows total actual power attenuation readings)

AGC control enabled
AGC control mode RF
AGC automatic mode select enabled
AGC zero mode Manual

AGC zeroed at -60.36 dBm (60.38 dB attenuation)
AGC auto zero hold threshold 0.000 dB SNR
AGC auto raising zero time constant 0.250 seconds
AGC auto lowering zero time constant 0.250 seconds
AGC loop total attenuation 60.062 dB
Bulk attenuator AGC control enabled, switched outCMFM$agc
AGC control enabled
AGC control mode RF
AGC automatic mode select enabled
AGC zero mode Manual
AGC zeroed at -60.36 dBm (60.38 dB attenuation)
AGC auto zero hold threshold 0.000 dB SNR
AGC auto raising zero time constant 0.250 seconds
AGC auto lowering zero time constant 0.250 seconds
AGC loop total attenuation 60.062 dB
Bulk attenuator AGC control enabled, switched out

2.1.1.5.1 Automatic Gain Control Bulk Attenuation - AGC BA

The **AGC BA x** command sets the bulk attenuation parameters. The bulk attenuator has three modes In, Out, and Auto. Setting the bulk attenuator to In or Out removes the bulk attenuator from AGC control and forces it In or Out, respectively. Setting it to Auto allows the AGC mode to control it.

There are no hard value limits for the switch in/out threshold at input power due to variances in other parameters such as gain, calibration, and temperature. It will clip to a minimum or maximum value and report that setting.

The bulk attenuation switch out threshold is forced to match the switch in threshold when the AGC is in IF mode. This is to prevent the AGC from attempting to switch the bulk attenuator while using a path that doesn't have a bulk attenuator.

AGC [BA [<e>|V <a>|D <t>|{I|O <t> [A]}]] - AGC bulk attenuation settings

<e> - Sets bulk attenuation control enable to <e>

where: <e> - Enable

0 - Disabled, switched out

1 - Enabled, switched in

A - AGC control enabled

V <a> - Attenuation value to <a>, 0.0000 to 511.9375 dB

D <t> - Switch out threshold delta attenuation <t>, -255.5 to -0.0 dB

I|O <t> - Switch In|Out threshold at input power <t>, in dBm

I|O <t> A - Switch In|Out threshold at attenuation <t>, 0.0 to 255.5 dB

Examples:

AGC BA 1	Bulk attenuator AGC control enabled, switched in
AGC BA V 17.000	Set attenuation value to 17.000 dB
	Valid range 0.0000 to 511.9375 dB
AGC BA D 33.3	Set switch out threshold delta attenuation to -33.3 dB
	Valid range -255.5 to -0.0 dB
AGC BA I x	Set switch in threshold at input power to x dBm
AGC BA O x	Set switch out threshold at input power to x dBm

2.1.1.5.2 Automatic Gain Control Data Settings - AGC DATA

The AGC DATA command is used to set the AGC table attenuation value for a specific attenuator along with an attenuation or data operation value. Parameter values are explained below.

AGC DATA [<p> <a> = <v>|<o>] - AGC data settings

<p> <a> = <v> - Set AGC table attenuation <p>, attenuator <a> to attenuation <v> dB

where:

<p> - 0.0 to 255.5 dB

<a> - Attenuator A, B, C, D, E

<v> - Attenuation 0.0 to 31.5 dB or 'MIN' or 'MAX'

<o> - Data operation

LOAD - Load data

ERASE - Erase data

SAVE - Save data

Example:

AGC DATA 2.2 E MIN	Set AGC table attenuation to 2.2 dB for attenuator E with attenuation of minimum

2.1.1.5.3 Automatic Gain Control Mode - AGC M

The **AGC M** command sets the automatic gain control loop mode.

AGC [M <m>] - Sets the AGC loop mode to <m>

where: <m> - AGC control mode

A - Automatically select mode based on source

R - Use RF attenuators

I - Use IF attenuators

Setting the AGC Mode to Auto automatically sets the AGC mode to RF/IF based on IF input path (which is based on the receiver frequency).

Setting the AGC Mode to RF forces control of the RF attenuators and (if the bulk attenuator is set to Auto) the bulk attenuator under AGC control.

Setting the AGC mode to IF forces control of the IF attenuators under AGC control and disables AGC control of the bulk attenuator. This also forces AGC Zero to Auto because when playing back recorded signals, such as demod/playback-demod, the noise floor changes as the AGC in the original recording holds the signal power steady and allows the noise floor to move. The dynamic range of the AGC closely matches the dynamic range of the auto zero.

Examples:

AGC M A	Automatically select mode based on source
AGC M R	Set AGC control mode to use RF attenuators
AGC M I	Set AGC control mode to use IF attenuators

2.1.1.5.4 Automatic Gain Control Loop Parameter - AGC L

The AGC L command sets AGC loop parameters.

AGC [L {P <t>|S <t>|A <t>|D <d>|C <d>|T <d>}] - Set AGC loop parameter

P <t> - Sets period to <t>, 0.000 to 5.464 us

S <t> - Sets sample time to <t>, 0.000 to 2.732 us

A <t> - Sets averaging sample time to <t>, 0.002 to 2100.897 ms

D <d> - Sets deadband to <d>, 0.0000 to 15.9375 dB

C <t> - Sets time constant to <t>, 0.100 to 1000.000 ms

T <d> - Sets power target to <d>, -100.0 to 13.0 dBm

Examples:

AGC L P 0.567	Set AGC loop period to 0.567 µs
	Valid range is 0.000 to 5.464 µs
AGC L S 1.987	Set AGC sample time to 0.567 µs
	Valid range is 0.000 to 2.732 µs
AGC L A 42.000	Set AGC averaging sample time to 42.000 ms
	Valid range is 0.002 to 2100.897 ms
AGC L D 0.0010	Set AGC deadband to 0.0010 dB
	Valid range is 0.0000 to 15.9375 dB
AGC L C 25.000	Set AGC time constant to 25.000 ms
	Valid range is 0.100 to 1000.000 ms
AGC L T -70.0	Set AGC power target to -70.0
	Valid range is -100.0 to 13.0 dBm

2.1.1.5.5 Automatic Gain Control Attenuator Look Up Table - AGC LUT

The **AGC LUT** command displays or rebuilds the attenuator look up table.

AGC LUT [<p>|R] - AGC attenuator Look Up Table

<p> - Show AGC LUT <p> attenuation

R - Rebuild AGC LUT

Examples:

AGC LUT 111.5	Display AGC look up table 111.5 attenuation
	Valid range is 0.0 to 255.5 dB
AGC LUT R	Rebuild AGC look up table

2.1.1.5.6 Automatic Gain Control Auto Zero - AGC AZ

The **AGC AZ** command enables or disables AGC auto zero and sets hold threshold or time constants.

AGC [AZ [TR <c>|TL <c>]]

TR <c> - Sets the AGC DSP auto zero raising time constant to <c>, 0.050 to 100.000 seconds

TL <c> - Sets the AGC DSP auto zero lowering time constant to <c>, 0.050 to 100.000 seconds

Examples:

AGC AZ 0	Disable AGC auto zero
AGC AZ 1	Enable AGC auto zero
AGC AZ T 0.100	Set AGC DSP auto zero time constant to 0.100 seconds
	Valid range 0.050 seconds to 100.000 seconds

2.1.1.5.7 Automatic Gain Control Zero - AGC Z

The **AGC Z** command sets the AGC Zero operating mode and the value at which zero can be set.

AGC [Z [M <m>]] - Sets the AGC zero mode to <m>

where: <m> - AGC zero mode

A - Auto: Automatically set AGC zero level

M - Manual: Manually set AGC zero level, reset on frequency or IF bandwidth change, reset on power cycle

H - Hold: Manually set AGC zero level, NO reset on frequency or IF bandwidth change, reset on power cycle

S - Hold and Save: Manually set AGC zero level, NO reset on frequency or IF bandwidth change, NO reset on power cycle

AGC [Z [<p>|Z|R]]

<p> - Sets the AGC output zero to <p> in dBm

Z - Sets the AGC output zero to current

R - Resets the AGC output zero to nominal

Examples:

AGC Z A	Automatically set AGC zero level
AGC Z M m	Manually set AGC zero level, reset on frequency, or IF bandwidth change;
	Reset on power cycle
AGC Z H	Manually set AGC zero level, NO reset on frequency or IF bandwidth change;
	Reset on power cycle

AGC Z S	Manually set AGC zero level, NO reset on frequency or IF bandwidth change; NO reset on power cycle
AGC Z 2	Set AGC output zero to 2 dBm
AGC Z R	Reset AGC output zero to nominal
AGC Z Z	Set AGC output zero to current

2.1.1.6 High Speed Output Mixer Settings - AHM

The AHM command displays and controls high speed (video) output mixer settings.

AHM [<f>|<c> [<e>]] - Sets high speed (video) mixer parameters

<f> - Sets mixer frequency for ALL channels to <f>, -46.6667 to 46.6667 MHz

<c> <e> - Sets channel <c> mixer enable to <e>

where:

<c> - Channel to set enable

A - Channel DAC A

B - Channel DAC B

C - Channel DAC C

D - Channel DAC D

<e> - Enable

0 - Disabled

1 - Enabled

Examples:

AHM

high speed (video) mixer at 0.0000 MHz
Channel DAC A mixer disabled
Channel DAC B mixer disabled
Channel DAC C mixer disabled
Channel DAC D mixer disabled

AHM x	Sets mixer frequency for all channels in MHz Valid range is -46.6667 to 46.6667 MHz
AHM c x	Sets a specific channel (c) mixer to enabled or disabled Valid channel mixer values are A, B, C, or D
For example:	AHM B 1 sets channel DAC B to Enabled AHM D 0 sets channel DAC D to Disabled.

2.1.1.7 High/Low Speed Outputs

The receiver has four generic high speed (video) analog outputs, four generic low speed analog outputs, and four generic clock/data paired digital outputs. While there are signals that are normally found on these outputs, there is also a list of other sources that can be connected.

A receiver channel is conceptually divided into two basic parts. One is the common 'platform' and the other is the 'demodulator'. The 'platform' is common to all telemetry modulations schemes. The demodulator is specific to the telemetry modulations scheme.

Some commands operate at the platform level, some at the demodulator level, and some at specific configurations of the demodulator. This is why the Help displays in this manner:

System Commands

H ? for help on help

ACU Antenna control unit — ADC ADC register

UP Unit Parameters — VE Version

Demodulator/Receiver Commands

AEQ Adaptive equalizer — DLS Data path lock status

PCMFM Commands

FM FM demodulator — MI Modulation index scale

Some of these sources are part of the 'platform' and some of these sources are specific to the demodulator in use.

The commands AHO, ALO, DHO, and DLO are the source control commands for the platform.

These commands control source, (for analog outputs, scale, offset,) and polarity.

- AHO - Analog High-Speed Outputs
- ALO - Analog Low-Speed Outputs
- DHO - Digital High Speed Outputs
- DLO – Digital Low Speed Outputs

2.1.1.7.1 Analog High Speed Output - AHO

The AHO command displays and controls the high speed (video) output settings.

Parameter values are explained below.

AHO [<c> [<s>|<p>|S <s>|O <o>] |E <e>]

where:

<c> is the channel to set; Valid entries are:

- A - Channel DAC A
- B - Channel DAC B
- C - Channel DAC C

- D - Channel DAC D

<s> sets the channel source to one of the options below (if desired):

- IF0 - Physical channel 0 IF input
- IF1 - Physical channel 1 IF input
- P0I - Physical channel 0 downconverted baseband I only
- P0Q - Physical channel 0 downconverted baseband Q only
- P0T - Physical channel 0 tape output source (needs mixer)
- P1I - Physical channel 1 downconverted baseband I only
- P1Q - Physical channel 1 downconverted baseband Q only
- P1T - Physical channel 1 tape output source (needs mixer)
- CMBI - Combiner baseband I only
- CMBQ - Combiner baseband Q only
- CMBT - Combiner tape output source (needs mixer)
- DP0 - Data path high-speed signal 0
- DP1 - Data path high-speed signal 1
- DP2 - Data path high-speed signal 2
- DP3 - Data path high-speed signal 3
- F0 - Fixed value 0
- F1 - Fixed value 1

OR

<p> sets the channel polarity to one of the values below:

- {0|+} - Active high (normal)
- {1|-} - Active low (inverted)

OR

S <s> sets the channel scale to a value between -128.0000 and 127.9961

OR

O <o> sets the channel offset to a value between -1.0000 and 0.9995

E <e> sets the channel enable to enabled or disabled

- 0 - Disabled
- 1 - Enabled

Example:

AHO Displays current high speed (video) output status settings (enabled/disabled and output frequency)

high speed (video) Channel DAC A
Source Data path high-speed signal 0
Scale - 1.0000
Offset - 0.0000
Polarity - High (+)

high speed (video) Channel DAC B
Source Data path high-speed signal 1
Scale - 1.0000
Offset - 0.0000
Polarity - High (+)

high speed (video) Channel DAC C
Source Physical channel 0 downconverted baseband I only
Scale - 1.0000
Offset - 0.0000
Polarity - High (+)

high speed (video) Channel DAC D
Source Physical channel 0 downconverted baseband Q only
Scale - 1.0000
Offset - 0.0000
Polarity - High (+)

70 MHz modulator disabled

AHO B P1T	Sets the channel to Channel DAC B with Physical channel 1 tape output source; (Needs mixer)
AHO D S -42.0000	Sets the channel to Channel DAC D with a channel scale of -42.0000
AHO C O 0.1234	Sets the channel to Channel DAC C with a channel offset of 0.1234
AHO A E 1	Sets the channel to Channel DAC A and enables the channel

AHO M - Sets the 70 MHz modulator output to enable or disable

Examples:

AHO M 0	Disabled
AHO M 1	Enabled

AHO -V ? - Shows extended Help for the AHO command

2.1.1.7.2 Analog Low Speed Output - ALO

The ALO command displays and controls the low speed (ACU) output settings.

Parameter values are explained below.

ALO [<c> [<s>|<p>|S <s>|O <o>] |E <e>]

where:

<c> is the channel to set; Valid entries are:

- A - Channel A (AM)
- B - Channel B (Aux Analog A Out)
- C - Channel C (AGC)
- D - Channel D (Aux Analog B Out)

<s> sets the channel source to one of the options below (if desired):

- AM – Demodulated AM
- AGC – AGC output
- CMBW – Combiner weight
- DP0 – Data path low-speed source 0
- DP1 – Data path low-speed source 1
- DP2 – Data path low-speed source 2
- DP3 – Data path low-speed source 3
- DQDEC – DQ decode
- DQDP – DQ datapath
- DQOUT – DQ output
- DS0 – DSP SNR 0
- DS1 – DSP SNR 1
- EA0 – External AGC 0
- EA1 – External AGC 1
- F0 – Fixed value 0
- F1 – Fixed value 1
- IA0 – Internal AGC 0
- IA1 – Internal AGC 1

OR

<p> sets the channel polarity to one of the values below:

- {0|+} - Active high (normal)
- {1|-} - Active low (inverted)

OR

S <s> sets the channel scale to a value between -128.0000 and 127.9961

OR

O <o> sets the channel offset to a value between -1.0000 and 0.9995

E <e> sets the channel enable to enabled or disabled

- 0 - Disabled
- 1 - Enabled

Examples:

ALO C AGC	Sets the channel to Channel C (AGC) with AGC output
ALO D 1	Sets the channel to Channel D (Aux Analog B Out) with polarity active low (inverted)
ALO A S 98.6543	Sets the channel to Channel A (Demodulated AM) with channel scale set to 98.6543
ALO B E 0	Sets the channel to Channel B and disables the channel

ALO -V ? - Shows extended Help for the AHO command

Example:

ALO Displays current low speed (ACU) output status settings (enabled/disabled and output frequency)

low speed (ACU) Channel A (AM)
Source Demodulated AM
Scale - 1.0000
Offset - 0.0000
Polarity - High (+)

low speed (ACU) Channel B (Aux Analog A Out)
Source Fixed value 0
Scale - 1.0000
Offset - 0.0000
Polarity - High (+)

low speed (ACU) Channel C (AGC)
Source AGC output
Scale - 1.0000
Offset - 0.0000
Polarity - High (+)

low speed (ACU) Channel D (Aux Analog B Out)
Source Fixed value 0
Scale - 1.0000
Offset - 0.0000
Polarity - High (+)

2.1.1.7.3 Digital High Speed Input – DHI

DHI displays and controls high speed digital input settings.

DHI [<c> <s>] – Sets channel <c> to source <s>

where:

<c> - Input channel

NC – Not Connected

<s> - Signal source

F0 – Fixed 0

F1 – Fixed 1

GC – Generator Clock

GD – Generator Data

TH5 – Top Hat 5

TH7 – Top Hat 7

DHI [<s> <p>] – Sets source <s> polarity to <p>

where:

<s> - Input source

TH5 – Top Hat 5

TH7 – Top Hat 7

<p> - Input polarity

{0|+} – Active high (normal)

{1|-} – Active low (inverted)

2.1.1.7.4 High Speed Digital Output - DHO

DHO displays and controls high speed digital output settings.

DHO [<c> <s>] - Sets channel <c> to source <s>

where:

<c> - Output channel

AC - Channel A Clock

AD - Channel A Data

BC - Channel B Clock

BD - Channel B Data

CC - Channel C Clock

CD - Channel C Data

DC - Channel D Clock

DD - Channel D Data

TH1 - Top Hat 1

TH2 - Top Hat 2

<s> - Signal source

F0 - Fixed 0

F1 - Fixed 1

GC - Generator Clock

GD - Generator Data

AC - Clock A

AD - Data A

BC - Clock B

BD - Data B

DP0 - Datapath 0

DP1 - Datapath 1

DP2 - Datapath 2

DP3 - Datapath 3

DP4 - Datapath 4

DP5 - Datapath 5

DP6 - Datapath 6

DP7 - Datapath 7

DHO [<c> <p>] - Sets channel <c> polarity to <p>

where:

<c> - Output channel

AC - Channel A Clock

AD - Channel A Data

BC - Channel B Clock

BD - Channel B Data

CC - Channel C Clock

CD - Channel C Data

DC - Channel D Clock

DD - Channel D Data

TH1 - Top Hat 1

TH2 - Top Hat 2

<p> - Output polarity

{0|+} - Active high (normal)

{1|-} - Active low (inverted)

2.1.1.7.5 Low Speed Digital Input – DLI

DLI displays and controls low speed digital input settings.

DLI [<c> <s>] – Sets channel <c> to source <s>

where:

<c> - Input channel

UR0 – UART Rx 0

UR1 – UART Rx 1

<s> - Signal source

F0 – Fixed 0

F1 – Fixed 1

URX – UART Rx

TH8 – Top Hat 8

TH9 – Top Hat 9

TH10 – Top Hat 10

TH11 – Top Hat 11

TH12 – Top Hat 12

TH14 – Top Hat 14

TH18 – Top Hat 18

TH20 – Top Hat 20

TH21 – Top Hat 21

DLI [<s> <p>] – Sets source <s> polarity to <p>

where:

<s> - Input source

URX – UART Rx

TH8 – Top Hat 8

TH9 – Top Hat 9

TH10 – Top Hat 10

TH11 – Top Hat 11

TH12 – Top Hat 12

TH14 – Top Hat 14

TH18 – Top Hat 18

TH20 – Top Hat 20

TH21 – Top Hat 21

<p> - Input polarity

{0|+} – Active high (normal)

{1|-} – Active low (inverted)

2.1.1.7.6 Low Speed Digital Output – DLO

DLO displays and controls low speed digital output settings.

DLO [<c> <s>] - Sets channel <c> to source <s>

where:

<c> - Output channel

UTX - UART Tx

TH3 - Top Hat 3

TH4 - Top Hat 4

TH6 - Top Hat 6

TH13 - Top Hat 13

TH15 - Top Hat 15

TH16 - Top Hat 16

TH17 - Top Hat 17

TH19 - Top Hat 19

TH22 - Top Hat 22

<s> - Signal source

F0 - Fixed 0

F1 - Fixed 1

UT0 - UART Tx 0

UT1 - UART Tx 1

DP0 - Datapath 0

DP1 - Datapath 1

DP2 - Datapath 2

DP3 - Datapath 3

DP4 - Datapath 4

DP5 - Datapath 5

DP6 - Datapath 6

DP7 - Datapath 7

DLO [<c> <p>] - Sets channel <c> polarity to <p>

where:

<c> - Output channel

UTX - UART Tx

TH3 - Top Hat 3

TH4 - Top Hat 4

TH6 - Top Hat 6

TH13 - Top Hat 13

TH15 - Top Hat 15

TH16 - Top Hat 16

TH17 - Top Hat 17

TH19 - Top Hat 19

TH22 - Top Hat 22

<p> - Output polarity

{0|+} - Active high (normal)

{1|-} - Active low (inverted)

2.1.1.8 Low Speed Mixer Control - ALM

The ALM command displays and controls low speed (ACU) output mixer settings

ALM [<f>|<c> [<e>]] - Sets low speed (ACU) mixer parameters

<f> - Sets mixer frequency for ALL channels to <f>, -100.0000 to 100.0000 kHz

<c> <e> - Sets channel <c> mixer enable to <e>

where:

<c> - Channel to set enable

A - Channel A (AM)

B - Channel B (Aux Analog A Out)

C - Channel C (AGC)

D - Channel D (Aux Analog B Out)

<e> - Enable

0 - Disabled

1 - Enabled

Examples:

ALM x Sets mixer frequency for all channels in MHz
Valid range is -46.6667 to 46.6667 MHz

ALM c x Sets a specific channel (c) mixer to enabled or disabled
Valid channel mixer values are A, B, C, or D

For example: ALM B 1 sets channel DAC B to Enabled
ALM D 0 sets channel DAC D to Disabled.

ALM

low speed (ACU) mixer at 0.0000 kHz
Channel A (AM) mixer disabled
Channel B (Aux Analog A Out) mixer disabled
Channel C (AGC) mixer disabled
Channel D (Aux Analog B Out) mixer disabled

2.1.1.9 Lock Status Command - AL

The Lock Status command reports the system lock status.

Example:

AL

System Lock is active

2.1.1.10 Best Channel Selector – BCS

The BCS command displays and controls the best channel selector settings.

BCS [<e>] - Enables best channel selection

where: <e> - Enable

0 – Disabled (Off)

1 – Enabled (On)

BCS [T <t>] - Sets best channel selector threshold <t>, 0 to 255

BCS [PH <n>] - Sets best channel selector pin hold delay 2^<n>, 0 to 15 cycles

BCS [S <s> <e>] - Sets best channel selector source <s> enable to <e>

where:

<s> - Sources

CH0 - Channel 0

CH1 - Channel 1

INT - Internal

<e> - Enable

0 - Disabled

1 – Enabled

Example:
PCMFM$bcs
BCS enabled
BCS threshold 192
BCS pin hold delay 2^2 cycles
System status display elements:
BCS - - Best channel selector

2.1.1.11 Bit Rate - BR

The Bit Rate command sets or reports the baseband bit rate. The value reported by this command is shown on the Browser Interface in the Advanced Settings, Sync Bit Rate field.

BR [<r>|M|SM]

<r> - Set bit rate to <r>, 0.0240 to 23.0000 Mb/s

M - Show measured bit rate

SM - Set bit rate to measured bit rate

BR M - Show the current measured bit rate

BR M Display measured bit rate in Mbps

BR SM - Set the bit rate to the measured bit rate

BR SM Set the bit rate to the measured bit rate in Mbps

Examples:

BR Report the bit rate setting

Bit rate: 1.000000 Mb/s

BR 5 Set bit rate to 5 Mbps

BR 0.6 Set bit rate to 600 Kbps

Valid range is 0.0080 to 23.0000 Mbps

2.1.1.12 Combiner Control – CMB

The Combiner Control command displays and controls combiner settings.

CMB [<e>|M <m>|W <s>|]

<e> - Sets combiner enable to <e>

where: <e> - Enable

0 – Disabled

1 – Enabled

M <m> - Sets combiner operation mode to <m>

where: <m> - Operation Mode

M – Maximal Ratio

B – Best Source

W <w> - Sets combiner weighting source to <s>

where: <s> - Weighting Source

SNR – Ultra-Dynamic – Signal to Noise Ratio

DQ – Ultra-Precision – Data Quality

CMB [A <e>|H <t>|B <b>]

A <e> - Sets combiner time aligner enable to <e>

where: <e> - Enable

0 – Disabled

1 – Enabled

A H <t> - Sets aligner hold below Eb/N0 <t>, -20.000 to 30.000 dB or -100.000 is off

A B <b> - Sets aligner with timing offset above <b>, 0.010 to 1.000 bits

CMB A P <p> – Sets the aligner hold period to <p>

Example:

CMB A P 5007 Set CMB aligner hold period to 5007 µs
Valid range is 0.000 to 4294967296.000 µs; initialized value is 5000 µs

CMB [BSS <h>] – Sets combiner BSS mode hysteresis <h>, 0.000 to 48.131

CMB [B <s>|MB <b>|L <f>>|Z <v>]

B <s> - Sets combiner bit rate to bandwidth scale to <s>, 0.001000 to 10.000000

MB <b> - Sets combiner maximum bandwidth to <b>, 0.000001 to 10.000000

L <f> - Sets combiner frequency error limit to <f>, .00000002173 to 23.3333 of bit rate

Z <v> - Sets combiner loop zeta to <v>, 0.001 to 10.000

CMB [BI <t>|BO <t>] – Sets combiner maximal ratio to BSS in/out thresholds

BI <t> - Sets combiner maximal ratio mode to BSS hold mode threshold to <t>

BO <t> - Sets combiner maximum BSS hold mode to ratio mode threshold to <t>

Examples:

CMB BI x Set combiner BSS in to value
CMB BO x Set combiner BSS out to value
Value range -24.065 to 24.065

CMB [HI <t>|HO <t>] - Set combiner hold in/out thresholds

HI <t> - Sets combiner hold in to <t>, -24.065 to 24.065

HO <t> - Sets combiner hold out to <t>, -24.065 to 24.065

Examples:

CMB HI x Set combiner hold in to value
CMB HO x Set combiner hold out to value
Value range -24.065 to 24.065

Examples:

CMB

System configured for Physical input 0
Combiner frequency error -0.024177 MHz
Combiner error limit 0.06250 of bitrate
Combiner zeta 1.000
Hold in threshold 5.936 dB
Hold out threshold 0.000 dB
BSS in threshold 11.761 dB
BSS out threshold 8.936 dB
Aligner off
Average aligner time shift 0.00 ns (0.000 bits)
Aligner hold threshold 0.000 dB
Aligner max offset 0.333 bits

CMB 0 Set combiner Disabled
CMB 1 Set combiner Enabled

2.1.1.13 Clock Polarity - CP

The Clock Polarity command displays and controls clock output polarity.

CP [<p>] - Sets clock component output polarity

<p> - Set clock polarity to <p>

where:

<p> - Polarity

{0|+} - Active high (normal)

{1|-} - Active low (inverted)

Examples:

CP Report the clock source state

Clock polarity active High (+)

CP 0 Set clock inversion Off
CP 1 Set clock inversion On

2.1.1.14 Downconverting Antenna - DA

The Downconverting Antenna command displays and controls receiver C band to P band downconverting antenna

DA [<e>] - Sets the C band downconverting antenna enable to <e>

where: <e> - Enable

0 - Disabled (C band tunes directly)

1 - Enabled (C band tunes to downconverted P band)

Examples:

DA

Downconverting antenna is disabled

DA 0 Set downconvert antenna state to Off (Disabled); C band tunes directly

DA 1 Set downconvert antenna state to On (Enabled); C band tunes to downconverted P band

**Downconverting antenna control only available when using a 5-band downconverter AND P and C bands are enabled.

2.1.1.15 Differential Decoding - DD

The Differential Decoding command displays and controls differential decoder settings (SOQPSK mode only). Differential Decoding for DPM defaults to Disabled (Off).

DD <e> - Sets the differential decoder enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

Example:

DD

differential decoder disabled

2.1.1.16 Digital Output Muting - DOM

The Digital Output Muting command displays and controls lock detect controlled output settings.

DOM [<e>|T <t>|C <e>|D <e>]

<e> - Sets the output muting enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

T <t> - Sets the output muting unlock timeout to <t>, 0 to 46016 ms

C <e> - Sets clock output muting on unlock to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

D <e> - Sets data output muting on unlock to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

Example:
DOM

Output muting timeout 1000
Output muting clock enable 0
Output muting data enable 0

2.1.1.17 Data Polarity - DP

The DP command displays and controls data output polarity.

DP [<p>] - Sets data component output polarity

<p> - Set data polarity to <p>

where:

<p> - Polarity

{0|+} - Active high (normal)

{1|-} - Active low (inverted)

Examples:
DP
Data polarity active High (+)
DP 0 Set data polarity to NOT inverted (Off)
DP 1 Set data polarity to inverted (On)

2.1.1.18 Data Quality Encapsulation – DQ

The Data Quality command displays and controls data quality settings.

DQ [<e>|B <b>]

[<e>] - Enables data quality encapsulation

where: <e> - Enable

0 - Disabled

1 - Enabled

[B <b>] - Sets data quality encapsulation block size to <b>, 1 to 16384

DQ [RAW <t> <e>] - Sets data quality raw metric enable for table <t> to <e>

where: <t> - Table

DP - datapath LUT

DEC - decode LUT

OUT - output LUT

where: <e> - Enable

0 - Disabled

1 - Enabled

DQ LUT <t> [<p>[= <v>]] - Show/set data quality LUT value(s) for table <t>

where: <t> - Table

DP - datapath LUT

DEC - decode LUT

OUT - output LUT

where:

<p> - Data quality LUT index <p>, 0 to 255

<v> - Data quality LUT value <v>, 0.0000 to 0.999985

DQ [M <e> [<r>]] - Sets data quality encapsulation dump enable to <e> at rate <r>

where: <e> - Enable

0 - Disabled

1 - Enabled

<r> - Display rate <r>, 1 to 60000 ms

Example:
PCMFM$dq
Data quality encapsulation disabled
Data quality encapsulation block size 4096 bits
Average datapath BEP 1.005e-12
Average decode BEP 1.005e-12
Average output BEP 1.140e-12
DQ datapath bit count: 3253769216 error count: 2.70774440e+07 BEP: 8.322e-03
DQ decode bit count: 1725284352 error count: 2.58360140e+07 BEP: 1.497e-02
DQ output bit count: 1725284352 error count: 2.09354580e+07 BEP: 1.213e-02

DQ decode raw disabled
DQ datapath raw disabled

System status display elements:

DQ DP - - Average datapath DQ
DQ DEC - - Average decode DQ
DQ OUT - Normal Wide CSV - Average output DQ
DQ DPC - - DQ datapath counts
DQ DECC - - DQ decode counts
DQ OUTC - - DQ output counts

2.1.1.19 Derandomizer State - DR

The DR command displays and controls derandomizer settings.

DR [M <m>] – Sets the derandomizer mode to <m>

where: <m> - Derandomizer mode

N – None

I – IRIG

C – CCSDS (Only valid with LDPC)

Examples:

DR Derandomizer disabled
DR M I Derandomizer IRIG

2.1.1.20 Digital Status Output - DSO

There are two generic discrete digital outputs that are normally lock status and sync detect (used for synchronization time testing) but also have other potential sources. The Digital Status Output command controls the source, polarity, and override states.

Quasonix has a technology called HyperTrack, which is a digital interface between the receiver and an antenna controller. This is intended to replace the standard analog AM/AGC that has been in use for decades. While digital, HyperTrack uses the same cabling and connectors to reduce rewiring costs.

The user can select a standard AM/AGC, or the HyperTrack antenna control interface.

Sync detect is used to switch the AM output between analog and digital.

The lock detect output is available, if HyperTrack is not enabled, but it defaults to low.

Lock detect output = fixed value 0, active High (+) forced inactive (low)

For example:

DSO L LD
This command routes the Demod Lock status to the lock detect status output pin.

The lock detect will be the active output on the lock detect digital output.

Lock detect output = Lock detect active High (+) normal operation

One of the sources is HyperTrack data. When HyperTrack is enabled, the lock detect output becomes HyperTrack data, and is then unavailable.

The full command syntax follows:

DSO [<c> [<s>|<p>|M <m>]]

<c> <s> - Sets channel <c> source to <s>

where:

<c> - Channel

L - Lock detect output

<s> - Signal source

F0 – Fixed value 0

F1 – Fixed value 1

LD – Lock detect

SD – Sync detect

PL – PCM frame lock

PS – PCM sub-frame valid

HT – HyperTrack data

BE – BERT error

<c> <p> - Sets channel <c> polarity to <p>

where: <p> - Output polarity

{0|+} - Active high (normal)

{1|-} - Active low (inverted)

M <m> - Sets channel <c> output mode to <m>

where: <m> - Output mode

0 - Allows normal output

1 - Forces output to 1 (active)

-1 - Forces output to 0 (inactive)

Example:

DSO

Lock detect output = Lock detect active High (+) normal operation

Sync detect output = Sync detect active High (+) normal operation

2.1.1.21 Forward Error Correction - FEC

Forward Error Correction requires the K7 option in the serial number.

The FEC command displays and controls Forward Error Correction settings. Available settings vary depending on the selected mode.

2.1.1.21.1 FEC Settings for BPSK

FEC [RS <e>] - Sets Reed-Solomon enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

FEC [RSI <i>] - Sets Reed-Solomon interleave to <i>, 1 to 8

FEC [CV <e>] - Sets convolutional decode enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

FEC [CVS <e>] - Sets convolutional symbol decode enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

FEC [S <m> <s>] - Sets soft decision scale for mode <m> to <s>, -32.000 to 31.984

where: <m> - Mode

V - Viterbi K = 7 Rate = 1/2

FEC [ASM <t>] - Sets ASM threshold to <t>, 0 to 65535

2.1.1.21.2 FEC Settings for AQPSK

FEC [<d> RS <e>] - Sets Reed-Solomon enable for data <d> to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

FEC [RSI <i>] - Sets Reed-Solomon interleave to <i>, 1 to 8

FEC [<d> CV <e>] - Sets convolutional decode enable for data <d> to <e>

where:

<d> - Datapath component

A - Data A

B - Data B

<e> - Enable

0 - Disabled

1 - Enabled

FEC [CVS <e>] - Sets convolutional symbol decode enable to <e>

where:

<d> - Datapath component

A - Data A

B - Data B

<e> - Enable

0 - Disabled

1 - Enabled

FEC [S <m> <s>] - Sets soft decision scale for mode <m> to <s>, -32.000 to 31.984

where: <m> - Mode

V - Viterbi K = 7 Rate = 1/2

FEC [ASM <t>] - Sets ASM threshold to <t>, 0 to 65535

2.1.1.21.3 FEC Settings for DPM

FEC [CV <e>] - Sets convolutional decode enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

FEC [CVS <e>] - Sets convolutional symbol decode enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

FEC [S <m> <s>] - Sets soft decision scale for mode <m> to <s>, -32.000 to 31.984

where: <m> - Mode

V - Viterbi K = 7 Rate = 1/2

2.1.1.21.4 FEC Settings for SOQPSK/LDPC

FEC [LDPC {M <m>|I <s>}]

M <m> - Sets LDPC mode to <m>

where: <m> - LDPC mode

4k1 - 4k Rate 1/2

1k1 - 1k Rate 1/2

4k2 - 4k Rate 2/3

1k2 - 1k Rate 2/3

4k4 - 4k Rate 4/5

1k4 - 1k Rate 4/5

I <s> - Sets half iteration scale to <s>, 0.100 to 1.000

FEC [S <m> <s>] - Sets soft decision scale for mode <m> to <s>, -32.000 to 31.984

where: <m> - Mode

L - LDPC

FEC [ASM <t>] - Sets ASM threshold to <t>, 0 to 65535

2.1.1.21.5 FEC Settings for STC/LDPC

FEC [LDPC {M <m>|I <s>}]

M <m> - Sets LDPC mode to <m>

where: <m> - LDPC mode

4k1 - 4k Rate 1/2

1k1 - 1k Rate 1/2

4k2 - 4k Rate 2/3

1k2 - 1k Rate 2/3

4k4 - 4k Rate 4/5

1k4 - 1k Rate 4/5

I <s> - Sets half iteration scale to <s>, 0.100 to 1.000

FEC [S <m> <s>] - Sets soft decision scale for mode <m> to <s>, -32.000 to 31.984

where: <m> - Mode

L - LDPC

FEC [ASM <t>] - Sets ASM threshold to <t>, 0 to 65535

2.1.1.22 Force Lock Indication - FL

The FL command displays and controls lock forcing settings.

FL [<l>] - Sets lock state to <l>

where: <l> - Lock state

0 - Normal operation

1 - Forced active

-1 - Forced inactive

Examples:

FL

Lock is normal
System lock is active
Datapath lock is active

FL 0 Force lock to Normal

FL 1 Force lock to On

FL -1 Force lock to Off

2.1.1.23 FM Demodulator Settings - FM

The FM command displays and controls FM demodulator settings.

Parameter values are explained below.

FM [<p>|S <s>|B <b>|D <m>]

where:

<p> sets the channel polarity to one of the values below:

- {0|+} - Active high (normal)
- {1|-} - Active low (inverted)

OR
S <s> sets the FM output scale to a value between -128.0 and 128.0

OR
B <b> sets the FM detector bandwidth to a value between 0.02 MHz and 46.00 MHz

The FM detector bandwidth cannot be less than current bit rate bandwidth (1.40 MHz). Refer to section 2.1.1.23.1 for additional details about the FM B x command.

OR
D <m> sets the NTSC Video deemphasis filter mode to one of three values

- 0 - Off
- N - NTSC
- P - PAL

Example:
FM
FM output polarity +
FM demodulator bandwidth 1.4 MHz
FM output scale 1.0
Video de-emphasis filter Off

2.1.1.23.1 FM Video Bandwidth Control - FM B

The FM B x command adjusts the I/Q (video) output bandwidth with PCM/FM in mind. Setting the FM (video) bandwidth wider than it would normally be set by the bit rate (this would be 1.1 to 1.4 wider than the bit rate) configures the system to allow a higher bandwidth on the output while allowing normal PCM/FM demodulation on the lower frequency PCM/FM.

- The video bandwidth can never be set narrower than the required bandwidth for the specified bit rate.
- The IF filter selection, if set to FS A, is wide enough to accommodate the wider FM (video) bandwidth.
- This configuration only operates properly in Phase Noise Compensation mode (PN 1).
- Modulation Index tracking must be turned OFF as it is incompatible with modulations like PCM/FM/FM.
- The video bandwidth must be set AFTER the bit rate has been set.
- Setting the bit rate sets the video bandwidth compatible with the bit rate.

2.1.1.24 Frequency - FR

The FR command displays and controls receiver frequency.

FR [<f>] - Sets receiver to <f> in MHz

where: <f> - Receiver frequency

P band: 200.0 to 1150.0 MHz

CT band: 1150.0 to 2500.0 MHz

C band: 4400.0 to 5250.0 MHz

70 MHz band: 70.0 to 70.0 MHz

Playback band: 0.1 to 20.0 MHz

Examples:

FR

Rx frequency 2200.500000 MHz

FR 2200.5 Set modulation to 2200.5 MHz

2.1.1.25 Help Command – H

H – Displays a list of basic Help commands

H ? – Displays "Help on Help"

Commas ',' indicate one or more of the following parameters are allowed:

If multiple parameters are specified they must be in the order in the list.

For example, BER [M [<s>,?[ ] - BER command followed by optional command control parameter 'M'. If the 'M' command control parameter is used, it is optionally followed by one or more parameters from the list <s>, '?'.

2.1.1.26 Advanced Help Command - HA

HA [-v] - Displays extended help for each command, if available

HA [<s>] - Searches help for <s> and displays it

Help on Help...

- Commands are tiered according to their degree of complexity/frequency of use into basic, advanced, or extended
- Basic command help can be accessed by 'H' or '?'
- Detailed help on any command is accessed by following the command with '?' such as <command> ?

Help/Command conventions:

- All commands are entered followed by 0 or more parameters.
- Each parameter is separated by one or more spaces.
- Each parameter may be either a value parameter to the command or a command control parameter that specifies the operation of the command.

<command> <parameter 1> <parameter 2> ...

- In general, a command with no parameters will display the commands associated status.

Detailed help displays follow a common convention:

- Upper case parameters indicate command control parameters that must be entered as specified:

BR M - BR command followed by the command control parameter 'M'

- Angle brackets '<' and '>' indicate value parameters. A value parameter is a variable parameter to a command. A value parameter may be either a numeric or text value, or an additional command control parameter:

FR <f> - FR command followed by the value parameter <f>

- Square brackets '[' and ']' indicate optional parameters:

  MO [<m>] - MO command followed by optional value parameter <m>

- Vertical bars '|' indicate a choice of parameters:

  AGC [M <m>|<e>]

  AGC command followed by optional M control parameter followed by the <m> value parameter OR AGC command followed by just the <e> value parameter.

- Braces '{' and '}' indicate a required value:

  DDT [P {<s>|<p>}]

  DDT command followed by optional command control parameter 'P'. If the 'P' command control parameter is used it is followed by a required <s> OR <p> value parameter.

A complex example:

AGC BA [<e>|V <a>|I|O <t> [A]]

The AGC command followed by the BA command control parameter, followed by one of:

<e> value parameter

OR

the V command parameter followed by the <a> value parameter

OR

the I or O command parameter followed by the <t> value parameter followed by an optional A command parameter

2.1.1.27 HyperTrack – HT

Displays and controls HyperTrack settings

HT [<e>|DR <r>|RSSI <d>|DQM <d>]

<e> - Sets adaptive equalizer enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

[DR <r>] - Sets data rate to <r>, 0.1152 to 40.0000 MHz

[RSSI <d>] - Sets RSSI decimation rate to 2^<d>, 0 to 15

[DQM <d>] - Sets DQM decimation rate to 2^<d>, 0 to 15

2.1.1.28 IF Filter Control - IF

The IF filter control command displays and controls the filter selections.

IF filters may be set to automatic based on the bit rate or the second IF filter may be set to a value based on a filter index.

IF [A|<s>|F <f>] - Sets IF filter control

A - Sets IF filter selections to automatic based on bit-rate

<s> - Sets second IF filter to <s>

where: <s> - Filter index

The **IF A** command sets the IF filter selections to automatic based on bit rate.

IF x sets the second IF filter to one of the filter index values listed below:

IF F x sets the first IF filter to one of the filter index values below:

- 0 - 12.0 MHz
- 1 - bypassed

Examples:

IF

Auto IF filter select enabled
First IF filter (0) 12.0 MHz
Second IF filter (5) 2.0 MHz

IF F 0 Sets the first IF filter to 12.0 MHz

IF 9 Sets the second IF filter to 10.0 MHz

2.1.1.29 Low Density Parity Check – LDPC

The LDPC command displays and controls Forward Error Correction settings.

LDPC [M <m>|A <t>|I <s>]

M <m> - Sets LDPC mode to <m>. LDPC mode is stored and transferred if the (waveform) Mode changes.

where: <m> - LDPC Mode

4k1 – 4k Rate 1/2

1k1 – 1k Rate 1/2

4k2 – 4k Rate 2/3

1k2 – 1k Rate 2/3

4k4 – 4k Rate 4/5

1k4 – 1k Rate 4/5

A <t> - Sets ASM threshold to <t>, 0 to 65535. This is not a stored parameter.

I <s> - Sets half iteration scale to <s>, 0.100 to 1.000

Examples:

LDPC

LDPC mode 4k Rate 2/3

LDPC decode ASM threshold 192

LDPC decode half iteration scale 0.900

LDPC A 42 LDPC decode ASM threshold 42

LDPC I .567 LDPC decode half iteration scale 0.567

2.1.1.30 Modulation Index - MI

The MI command displays and controls modulation index scale settings.

MI [<s>|M <m>|TH <h>|THE <e>|AD <d>|AS <s>|P <e>]

<s> - Sets modulation index scale to <s>, 0.350 to 8.000, this forces the mode to hold at the specified value

M <m> - Sets modulation index scale mode to <m>

where: <m> - Mode

O - Off (sets scale 1.0 for nominal deviation of 0.70)

H - Hold

A - Acquire

T - Tracking

TH <h> - Sets tracking-mode hold below Eb/N0 of <h>, -20.000 to 30.000

THE <e> - Sets tracking-mode hold below Eb/N0 enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

AD <d> - Sets acquire mode minimum delta H to <d>, 0.000 to 8.000

AS <s> - Sets acquire mode settling time to <s>, 20 to 10000 ms with a 10 ms resolution

P <e> - Sets the modulation index scale parameter (mode and H value) persistence to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

MI [TS {M <i>|T <i>|H <i>}]

M <i> - Sets modulation index trellis maximum index to <i>, 0.000 to 8.000

T <i> - Sets modulation index trellis target index to <i>, 0.000 to 8.000

H <i> - Sets modulation index trellis hysteresis to <i>, 0.000 to 8.000

Examples:

MI

Modulation index scaling mode acquire (Triggered at 27.57 Eb/N0)
Modulation index 0.701, estimated index 0.701
Tracking mode hold threshold 10.000 Eb/N0
Tracking mode hold enabled
Acquire mode delta H 0.005
Acquire mode settle time 500 ms
Operation persistence disabled

MI x	Sets mod index scale to a value between 0.350 and 8.000 and forces mode to hold at specified value
MI O	Disable Mod Index Tracking (Set to h=0.7)
MI A	Acquire mode enable
MI A D	Sets the maximum delta h (indicates a change in h defaults to 0.005)
MI A S	Sets the delta h settling time defaults to 500 ms
MI H	Hold Mod Index Tracking at current position
MI I	Sets Trellis Index
MI T	Tracking mode enable
MI T H x	Sets the Tracking Hold threshold below Eb/N0 (x) Valid range is -20.000 to 30.000

2.1.1.31 Modulation - MO

The MO command displays and controls mode settings.

MO [<m>] - Sets the demodulation mode to <m>

where: <m> - Mode

{0|PCMFM} - Pulse Code Modulation/Frequency Modulation

{1|SOQPSK} - Shaped Offset Quadrature Phase Shift Keying

{2|MhCPM} - Multi-h Continuous Phase Modulation

{3|BPSK} - Bi-Phase Phase Shift Keying

{4|QPSK} - Quadrature Phase Shift Keying

{5|AQPSK} - Asymmetrical Quadrature Phase Shift Keying

{6|AUQPSK} - Asymmetrical/Unbalanced Quadrature Phase Shift Keying

{7|OQPSK} - Offset Quadrature Phase Shift Keying

{8|UQPSK} - Unbalanced Quadrature Phase Shift Keying

{9|DPM} - Digital Phase Modulation

{11|STC} - Space Time Coding

{12|SOQPSK/LDPC} - Shaped Offset Quadrature Phase Shift Keying With LDPC

{13|STC/LDPC} - Space Time Coding With LDPC

Examples:

MO

Mode PCMFM - Pulse Code Modulation/Frequency Modulation

MO 0 Set modulation to PCM/FM
MO 1 Set modulation to SOQPSK-TG
MO 2 Set modulation to Multi-h CPM
MO 3 Set modulation to BPSK
MO 4 Set modulation to QPSK
MO 5 Set modulation to AQPSK
MO 6 Set modulation to AUQPSK
MO 7 Set modulation to OQPSK
MO 8 Set modulation to UQPSK
MO 9 Set modulation to Digital PM (DPM)
MO 11 Set modulation to Space Time Coding (STC)
MO 12 Set modulation to SOQPSK/LDPC
MO 13 Set modulation to STC/LDPC

2.1.1.32 Output Clock Measurement - OCM

The Output Clock Measurement command displays measured output clock frequency. Most of the time this is the same as the commanded bit rate but, depending on encoding/decoding and other factors, this may or may not be the commanded bit rate.

OCM - Shows measured clock rate

Example:

OCM

Component A measured datapath rate 0.999998 - commanded 0.999998
Component B measured datapath rate 0.000000 - commanded 0.000000

2.1.1.33 PCM Decoding - PDC

The PCM Decoding command displays and controls PCM digital decoder settings.

PDC [<t>] - Sets the PCM decoding to <t>

where: <t> - Decoding

NRZL - Non-return-to-zero, level

NRZM - Non-return-to-zero, mark

NRZS - Non-return-to-zero, space

RZ - Return-to-zero

BIPL - Bi-phase, level

BIPM - Bi-phase, mark

BIPS - Bi-phase, space

DMM - Delay modulation (Miller code), mark

DMS - Delay modulation (Miller code), space

M2M - Modified delay modulation (Miller squared code), mark

M2S - Delay modified modulation (Miller squared code), space

Example:

PDC

PCM decode NRZL - Non-return-to-zero, level

2.1.1.34 PCM Deframing - PDF

The PCM Deframing command displays and controls PCM Deframing settings.

PDF [<f>] – Shows the PCM deframing display in format <f>

where: <f> - Format (last used, if not specified)

N - Normal

C - CSV

PDF [<e> [-h][<f>][<r>]] - Sets PCM deframing tracking display enable to <e> in format <f> at rate <r>

where:

<e> - Enable

0 - Disabled

1 - Enabled

<f> - Format (last used, if not specified)

N - Normal

C - CSV

<r> - Display rate <r>, 100 to 60000 ms (500 ms if not specified)

Options:

-h - Do not display header

PDF [HEAD <f>] - Shows the system status header in format <f>

where: <f> - Format

N - Normal

C - CSV

PDF [CNT <e>|R]

[CNT <e>] – Sets the Frame count enable

where:

<e> - Enable

0 - Disabled

1 - Enabled

[CNT R] – Resets frame counts

PDF [A <e>]

A <e> - Sets automatic frame detection enable to <e>

where:

<e> - Enable

0 - Disabled

1 – Enabled

PDF [MA <l>|MI <l>]

MA <l> - Sets the major frame length to <l>, 1 to 256 minor frames

MI <l> - Sets the minor frame length to <l>, 1 to 16384 bits

PDF [FS <p>|OS <l>]

FS <p> - Sets the frame synchronization pattern to <p> in binary

where:

<p> - Pattern; single binary string or multiple binary triplets

Example:

Single binary string - 1110101110010000

Multiple binary triplets - 111 010 111 001 000 0

OS <l> - Sets the frame synchronization pattern to be optimum for <l> bits, 16 to 33

PDF -V ? - Show optimum synchronization patterns

PDF [DM <m>] - Sets the PCM frame discard mode to <m>

where: <m> - Mode

N - Discard none

FH - Discard minor frame header

FI - Discard minor frame header and ID

PDF ME [A|<e>] - Sets maximum number of synchronization bit errors to <e>, 0 to 64 or A for automatic

PDF [WL <l>|LT <t>|UT <t>]

WL <l> - Sets the synchronization window length <l>, 0 to 15 bits

LT <t> - Sets the 'lock' threshold to <t> consecutive good frames, 1 to 16

UT <t> - Sets the 'unlock' (search) threshold to <t> consecutive bad frames, 1 to 16

2.1.1.35 Receiver Channel Parameters

Six of the listed commands, PER, PERA, PLD, PRS, PSV, and RFD operate within the following constraints.

There are two forms the receiver channel parameters take. One is the current operating parameter set that controls the operation of the receiver brick and the other is the stored parameter set.

The current operating parameters are volatile in nature in that when the power is removed, the parameters are lost. The stored parameters are saved in FLASH memory in the receiver brick. When the receiver brick is turned on, the stored parameters are loaded into the current operating parameter set.

Parameters in the current operating parameter set can be changed without affecting the stored parameter set. When the receiver brick is powered down, current operating parameters go away and when powered on, the stored parameter set becomes the current operating parameter set.

2.1.1.35.1 Parameters Erase - PER

The Parameters Erase command erases the stored parameter set for the current mode. It has no impact on the current operating parameter set. If the receiver brick is power cycled, the current operating parameter set is set to defaults.

Example:

PER

Erasing parameter data... ok

2.1.1.35.2 All Parameters Erase - PERA

The Parameters Erase command erases the stored parameter set for all modes. It has no impact on the current operating parameter set. When the receiver brick is power cycled, all operating parameters set are set to defaults.

Example:

PERA

Erasing parameter data... ok

2.1.1.35.3 Parameter Load - PLD

The Parameter Load command loads the stored parameter set into the current operating parameter set.

Example:

PLD

Loading parameter data... ok

2.1.1.35.4 Parameter Reset - PRS

The Parameter Reset command resets the current operating parameter set to the defaults. This does not affect the stored parameter set.

Example:

PRS

Initializing parameter data... ok

2.1.1.35.5 Parameters Save - PSV

The Parameters Save command writes the current operating parameter set into a (previously erased) stored parameter set.

Example:

PSV

Saving parameter data... ok

2.1.1.35.6 RF Path Attenuation – RFA

RFA [<p>] – Sets RF path attenuation to <p>

where: <p>

MIN

MAX

0.0 to 126.0 dB using AGC table

2.1.1.35.7 Reset to Factory Defaults - RFD

The Reset to Factory Defaults command erases the stored parameter set for ALL modes then resets the current operating parameter set to the defaults including mode (it changes to the default mode).

Example:

RFD

WARNING: ALL CONFIGURATION PARAMETER DATA IS ABOUT TO BE ERASED!!
THIS CANNOT BE UNDONE!!
Enter "YES" to continue!$
Aborted

2.1.1.36 Power Level - PL

The PL command reports or sets the current input power level setting.

PL [<e>[-h][<f>][<r>] - Sets power level tracking display enable to <e> in format <f> at rate <r>

where:

<e> - Enable

0 – Disabled

1 – Enabled

<f> - Format (last used, if not specified)

N – Normal

C – CSV

<r> - Sets display rate to <r>

Valid range is 100 to 60000 ms (500 ms if not specified)

Options:

-h – Do not display header

PL [HEAD <f>] – Shows system status header in format <f>

where:

<f> - Format (last used, if not specified)

N – Normal

C – CSV

Examples:

PL

```
Input dBm  Atten dB  Signal dBm    Adj dBm    Eb/N0 dB Saturation
60.48     59.750      -3.43      13.03      27.30          0
Power leveling automatic
Power leveling active
Power level target power  13.00 dB
Power level scale   0.00 dB
Power level measurement signal + noise
Power level filtering enabled
```

PL 0 Set the current power level information tracking display to Off

PL 1 Set the current power level information tracking display to On

PL C A – Sets power level automatic control mode

Examples:

PL C A 0 Set the power level automatic control mode to Software

PL C A 1 Set the power level automatic control mode to Hardware

PL F – Sets the average and adjusted power level filter coefficient

Example:

PL F 5 Set the power level filter coefficient to 5

Valid range is 1 to 16

PL M – Sets the power level measurement type

Examples:

PL M 0 Set the power level measurement type to Total Power

PL M 1 Set the power level measurement type to Signal Power

PL S – Sets the power level scale value

Example:

PL S 2.517 Set the power level scale value to 2.517
Valid range is 0.000 to 7.996

2.1.1.37 Phase Noise Compensation - PNC

The PNC command reports or sets the phase noise compensation state.

PNC [<m>|D <d>|H <h>]

<m> - Sets phase noise compensation mode to <m>

where: <m> - Mode

0 - Disabled

1 - Enabled

A - Automatic

D <d> - Sets auto phase noise compensation deadband to <d>

H <h> - Sets auto phase noise compensation hysteresis to <h> ms

Examples:

PNC Phase noise compensation off

PNC 0 Set phase noise compensation to Off

PNC 1 Set phase noise compensation to On

2.1.1.38 Query Temperature - QT

The Query Temperature command reports the temperature in degrees Celsius.

Example:

QT

FPGA temperature: 41.0°C (85°C Max)
Demod temperature: 43.0°C (85°C Max)

2.1.1.39 Signal Degradation Information - SDI

The Signal Degradation Information command sets and displays a variety of signal degradation information settings.

SDI [<e>|T <e>|S <s>|P <p>|L <l>|IT <t>|ET <t>]

<e> - Sets the SDI enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

T <e> - Sets the SDI tracking display enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

S <s> - Sets the SDI data source to <s>

where: <s> - Data source

P0 - Physical input 0

P1 - Physical input 1

CMB - Combiner

P <p> - Sets source polarity to <p>

where: <p> - Polarity

{0|+} - Active high (normal)

{1|-} - Active low (inverted)

L <l> - Sets lock state to <l>

where: <l> - Lock state

0 - Normal operation

1 - Forced active

-1 - Forced inactive

I <t> - Sets internal threshold to <t>, 0 to 65535, or A for automatic

E <t> - Sets external threshold to <t>, 0 to 65535, or A for automatic

Examples:

SDI

SDI enabled
SDI datasource Physical input 0
Lock is normal
SDI lock is inactive
Polarity - High (+)
SDI internal threshold automatically set to 32768
SDI external threshold automatically set to 403

SDI 0 Disable SDI

SDI 1 Enable SDI

SDI E - Sets signal degradation information external threshold

Examples:

SDI E A	Set SDI external threshold to automatic
SDI I 1943	Set SDI external threshold to 1943
	Valid range 0 to 65535

SDI I - Sets signal degradation information internal threshold

Examples:

SDI I A	Set SDI internal threshold to automatic
SDI I 4242	Set SDI internal threshold to 4242
	Valid range 0 to 65535

SDI L - Sets signal degradation information lock state

Examples:

SDI L 0	Set SDI lock state to normal operation
SDI L 1	Set SDI lock state to forced active
SDI L -1	Set SDI lock state to forced inactive

SDI P - Sets signal degradation information source polarity

Examples:

SDI P 0	Set SDI source polarity to active high (normal)
	Valid active high 0 or +
SDI P 1	Set SDI source polarity to active low (inverted)
	Valid active low 1 or -

SDI S - Sets signal degradation information source

Examples:

SDI S P0	Set SDI data source to Physical Input 0
SDI S P1	Set SDI data source to Physical Input 1
SDI S CMB	Set SDI data source to Combiner

SDI T - Sets signal degradation information tracking display enable or disable parameters

Examples:

SDI T 0	Disable SDI tracking display

SDI T 1 Enable SDI tracking display

2.1.1.40 Spectrum Inversion - SI

The SI command displays and controls receiver spectrum inversion.

SI [<e>]

where: <e> - Enable

0 - Disabled

1 - Enabled

Example:

SI

Spectrum inversion is disabled

2.1.1.41 Show Serial Number - SN

The SN command displays the part number and serial number for the connected RDMS™.

Example:

SN

Part Number: QSX-RDMS-3R1D-A1-1311-00-14-K7-EQ
Customer Model: CHANNEL 1
Serial Number: 2091
Hardware Rev:

2.1.1.42 Save Parameters - SV

The Save Parameters command erases the stored parameter set and writes the current operating parameter set into the stored parameter set in a single command.

Example:

SV

Saving parameter data... ok

2.1.1.43 Sync Detect – SYNC

The Sync Detect command displays and controls sync detect settings. The SYNC detect subsystem does not support fixed patterns.

SYNC <e> - Sets sync detect enable to <e>

where: <e> - Enable

0 - Disabled

1 - Enabled

Example:

SYNC

Sync detect inactive at 50.085 %

Sync detect disabled
Sequence is PN15
Sync detect window length 4095 bits
Sync detect threshold 99.000 %
Sync detect display tracking disabled

SYNC [D <e> [<r>]

<e> [<r>] - Sets sync detect tracking display enable to <e> at rate <r>

where:

<e> - Enable

0 - Disabled

1 - Enabled

<r> - Display rate <r>, 100 to 60000 ms

Example:

SYNC D 0 Disable sync detect tracking display
SYNC D 1 Enable sync detect tracking display
SYNC D 1 100 Enable sync detect tracking display at a 100 ms rate

SYNC [P <n>]

Sets sync detect pattern to PN sequence <n>

where: <n> is PN sequence PN6, PN9, PN11, PN15, PN17, PN20, PN23, or PN31

Example:

SYNC P PN6 Set sync detect pattern to PN6

SYNC [L <l>|T <t>]

[L <l>] - Sets sync detect window length to <l>, 1 to 4095 bits

[T <t>] - Sets sync detect correlation threshold to <t>, 0.000 to 100.000 percent

Example:

SYNC L 2048 Set sync detect window length to 2048
Valid range is 1 to 4095 bits

SYNC T - Sets sync detect correlation threshold

Example:

SYNC T 35 Set sync detect correlation threshold to 35 percent
Valid range is 0.000 to 100.00 percent

2.1.1.44 System Status Tracking - SYS

The SYS command displays system status and allows specification of the format: Normal (narrow), Wide (verbose), and CSV (Comma Separated Values). If "-h" is added to the command string, the header will not be displayed.

SYS [<e> [-h] [<f>] [<r>]] – Sets system status tracking display enable to <e> in format <f> at rate <r>. If not specified, Format and Rate will be the last one used, or the default if it was never specified.

where:

<e> - Enable

0 – Disabled

1 – Enabled

<f> - Format (last used, if not specified) Each item/parameter in the SYS display is optional within each display format.

N – Normal

W – Wide

C – CSV

<r> - Display rate <r>, 100 to 60000 ms (500 ms if not specified)

Options:

-h – Do not display header (This command suppresses header emission. This has to be specified with each command.)

SYS [HEAD [<f>|ELE [<f>]]

[HEAD <f>] – Shows the system status header in format <f>

[ELE [<f>]] – Shows the system status elements (items/parameters) for format <f>

where:

<f> - Format

N – Normal

W – Wide

C – CSV

SYS [<c>[<s>] <f> <e>] – Sets the system status element (item/parameter) <c> [<s>] display in format <f> to <e>

where:

<c> [<s>] - (Command <c> and subcommand <s>)

BEOL – Beginning/End of line marker

List of optional items/parameters that can be displayed.

Parameter	Description
TOD ST	System time
TOD DT	Date/Time of day (can be set with the TOD Command)
PL INP	Receiver input power
PL ATT	Input attenuation
PL SL	Demod signal level
PL ADJ	Adjusted signal level
PL EB	Signal Eb/N0
AFC DET	Detected AFC offset
AFC CMP	Compensated AFC offset
AFC S	AFC state
AGC EXT	External AGC zero
BR	Current bitrate
AL	Demod locked
DQ OUT	Average DQM in DQE
DQ DP	Average datapath DQM
PDF	PCM deframe
MI	Modulation index and mode

where:

<f> - Format (last used, if not specified)

N - Normal

W - Wide

C - CSV

A - All above

<e> - Enable

0 - Disabled

1 - Enabled

SYS [ALL <f> <e>] – Sets all system status elements (items/parameters) in style <f> to <e>

where:

<f> - Format (last used, if not specified)

N - Normal

W - Wide

C - CSV

A - All above

<e> - Enabled in

DEF - Default

0 - Disabled

1 - Enabled

Examples:

SYS 1

STC$sys 1

Input dBm	Eb/N0 dB	AFC DET kHz	BR Mb/s L	Avg DQE
-61.13	4.42	-10.959~	4.999991 !	1.023e-12
-61.07	4.43	-11.015~	4.999991 !	1.016e-12
-61.13	4.43	-11.032~	4.999991 !	1.013e-12
-61.13	4.42	-11.137~	4.999991 !	1.013e-12

2.1.1.45 Tape Out – TO

The Tape Out command displays and controls tape output settings. It can be enabled on video A or B outputs only. (C and D video outputs are used to drive the 70 MHz IF modulator on the combiner.)

The Tape Out carrier frequency can be specified in three ways:

Any frequency from 0 to 46 MHz

A standard IRIG channel

Any frequency from 0 to 46 MHz snapped to a standard IRIG channel

Tape Out enable, output channel select, and frequency save/restore propagate between mode changes.

TO [O <c> <m>|F<f>|I <f>|C <c>]

O <c> <m> - Sets tape output channel <c> mode to <m>

where:

<c> - Analog output channel

A - Channel A

B - Channel B

where:

<m> - Mode

0 - Disabled

1 - Enabled

C – Carrier

F <f> - Sets the tape output frequency to <f>, -46.6667 to +46.6667 MHz

I <f> - Sets tape output frequency <f> to the nearest IRIG standard channel

C <c> - Sets tape output frequency to IRIG standard channel <c>

where:

<c> - IRIG channel

0 – 112.5 kHz

1 – 150 kHz

2 – 225 kHz

3 – 300 kHz

4 – 450 kHz

5 – 600 kHz

6 – 900 kHz

7 – 1.2 MHz

8 – 1.8 MHz

9 – 2.1 MHz

10 – 2.4 MHz

11 – 3.6 MHz

12 – 4.8 MHz

13 – 7.2 MHz

14 – 9.6 MHz

2.1.1.46 Time of Day - TOD

The Time of Day command displays and sets the current calendar date and time of day values. This is primarily used to add a hard reference to the BERT (BER command) output. It is volatile and *must be reset after every power cycle or mode change*.

TOD [[mm/dd/yyyy] [hh:mm[:ss]]

where:

mm - Month 1 - 12

dd - Day of month 1 - 31

yyyy - Year

hh - Hour 0 - 23

mm - Minutes 0 - 59

ss - Seconds 0 = 59

Examples:

TOD

10/16/2015 14:34:06

Friday, October 16, 2015 02:34:06 PM

TOD 10/16/2015 14:34:00

2.1.1.47 Show Options - UP

The Show Options command displays unit parameter settings.

Example:

UP

Part Number: QSX-RDMS-3R1D-A1-1311-00-14-K7-EQ
Customer Model: CHANNEL 1
Serial Number: 2091
Hardware Rev:
Revisions options: None
Configured as receiver with IF SAW filters
1 channel
Housing is rack mount, IF input, TTL output
Enabled extended bands:
P band: 200.0 to 1150.0 MHz
CT band: 1150.0 to 2500.0 MHz
C band: 4400.0 to 5250.0 MHz
70 MHz band: 70.0 to 70.0 MHz
Playback band: 0.1 to 20.0 MHz

Enabled modes:
PSK
MHCPM
SOQPSK
STC
PCMFM
Pin out:
00 - Standard

Options:

EQ - Adaptive Equalizer

14 - 14 SAW Filters

K7 - Viterbi decode (k = 7 rate = 1/2)

2.1.1.48 Version - VE

The Version command displays the current application, FPGA, and adaptive equalizer versions.

Example:

VE

PCMFM App Rev: 1.0.7.137 Sep 18 2015 13:49:13

PCMFM FPGA Rev: 0000102A Sep 9 2015 19:19:51

AEQ Rev: 1.0.5 Sep 9 2015 19:13:52