

Avitech ASCII X Commands

(For Rainier 3G)



ABOUT THIS REFERENCE GUIDE

This reference guide contains information about how to use the Avitech ASCII Protocol (AAP) of Rainier 3G.

Throughout the reference guide the following conventions are used to distinguish elements of text.



provide additional hints or information that requires special attention.



identify warnings which must be strictly followed.

Any name of a menu, command, icon or button on the screen is shown in a bold typeset. For example: On the **Start** menu select **Settings**.

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1. ASCII X Command

The Rainier 3G supports the ASCII X command prompt interface through serial port (**RS-232**) and Ethernet port (**IP**).

This chapter discusses using the Avitech ASCII Protocol (AAP) of Rainier 3G.

 Before using ASCII X command, make sure to set **Normal** at **Serial Port Mode** in the Phoenix-Q utility **Properties** portion.

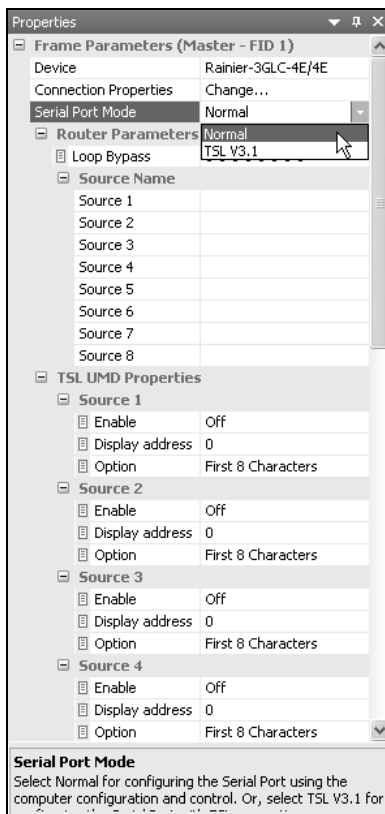


Figure 1-1 Phoenix-Q Utility: Serial Port Mode→Normal

1.1 ASCII X Command Format

The ASCII X command is comprised of the following parts:

Header	Group/Module/Window Assignment	Parameter 1	Parameter 2	...
--------	--------------------------------	-------------	-------------	-----

Figure 1-2 Parts of ASCII X Command

The following is a list of rules to follow when entering the ASCII X command:

- ❖ It is acceptable to enter commands in small or capital letters and the five columns are separated by a space.
- ❖ **Header** = x + command character.
- ❖ **Group/Module/Window** assignment (**GGGMMMPPP**) =
 - ✓ **Group** = is comprised of the first three digits (001–099), “000” is used to pertain to all groups.

- ✓ **Module** = is comprised of the middle three digits (001~099), "000" is used to pertain to all modules.
 - ✓ **Window Assignment** = is comprised of the last three digits (001~097), "000" is used to pertain to all window assignments, "098" is used to pertain to logo and "099" is used to pertain to clock.
- ❖ **Parameter 1** = for advance setting of each X command.

1.2 Preparing to Use ASCII X Commands

Before using the ASCII X command via the RS-232 interface, make sure that the COM (RS-232) port on the computer is set at **Normal (8-bit data, 1 stop bit, no parity, and no flow control)**. The default baud rate is **57600 bps (configurable)**.



1. Use Avitech Phoenix-Q utility to perform advance configuration before using ASCII X commands.
2. For more details about Phoenix-Q utility, refer to the Phoenix-Q user manual.

1.2.1 Connection through Ethernet Port

Step 1. Open the Phoenix-Q utility, click **System** → **Communication**.

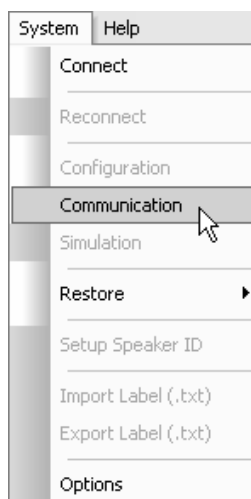


Figure 1-3 Phoenix-Q Utility: System→Communication



This operation is not available when the computer is connected to the Rainier 3G multiviewer.

Step 2. Make sure to specify the correct IP address of selected Rainier 3G, and click **Add to List** to continue.

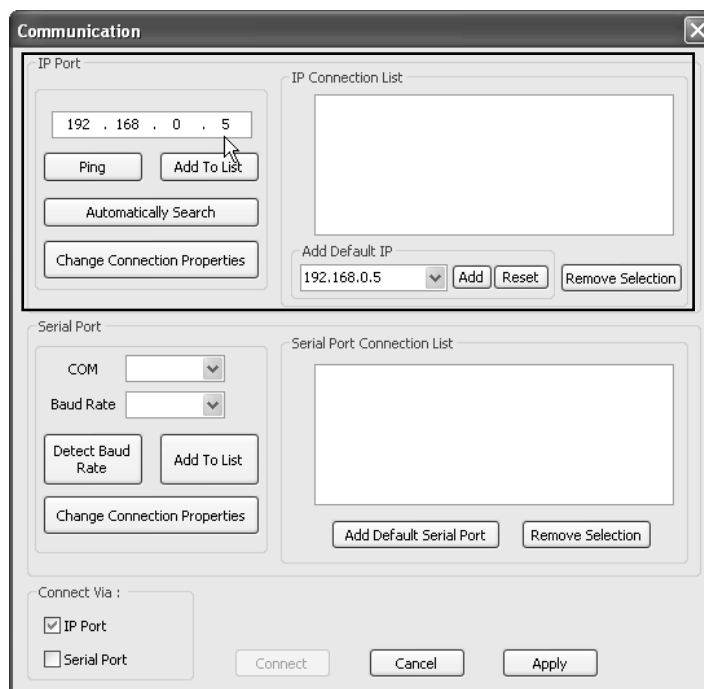



Figure 1-4 Phoenix-Q Utility: Enter IP Address

Step 3. Click **Apply** to activate the setting and click **Cancel** to exit Phoenix-Q utility.

1.2.2 Connection through Serial Port

Step 1. Open the Phoenix-Q utility. Click **System**→**Communication**.

 This operation is not available when computer is connected to the Rainier 3G multiviewer

Step 2. Make sure to specify the same **COM** port setting as controlling computer.

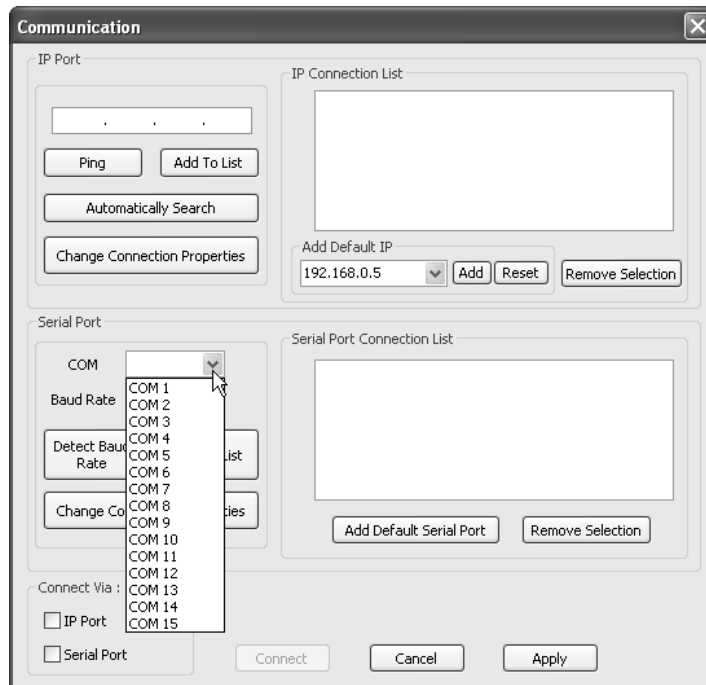


Figure 1-5 Phoenix-Q Utility: Select COM Port

Step 3. Select the correct **Baud Rate** for controlling computer.

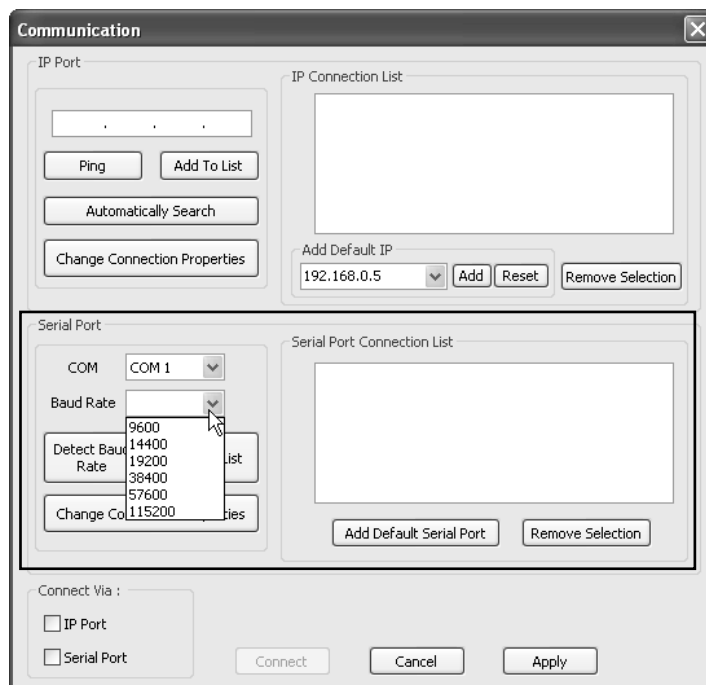


Figure 1-6 Phoenix-Q Utility: Select Baud Rate

Step 4. Click **Change Connection Properties** to select **Baud Rate** for the Rainier 3G **Serial Port** and click **OK** to exit.

Step 5. Click **Apply** to activate the setting and click **Cancel** to exit the Phoenix-Q utility.

1.3 Entering the ASCII X Command Interface

The following two methods allow you to enter and execute ASCII X commands:

- ✓ *ASCII Test utility (refer to Appendix A for details)*
- ✓ *Through TCP/IP programming (refer to Appendix B for details)*

1.4 ASCII X Command Summary

The following is a list of ASCII X commands:

XA	
Function	Set the automatic arrangement of windows.
Format	XA GGGMMMPPP [NbyN(2 (2×2),3 (3×3),.....)] [Nth(1,2,.....) position of window]
	XA 001009000 2 1 set group 1 module 9 to a 2×2 map position 1,2,3,4 (quad).
	XA 001002002 3 2 place group 1 module 2 window 2 to a 3×3 map position 2.
	XA 001002000 6 13 place group 1 module 2 to a 6×6 map position 13,14,15,16.
Example	XA 001000000 2 1 set group 1's all modules to quad.
	XA 001000000 automatically arrange all windows in group 1 to the optimum size and position.
	XA 000000000 automatically arrange all groups' windows to the optimum size and position.

Table 1-1 XA Command

XB	
Function	Turn on/off blinking of border or label.
Format	XB GGGMMMPPP B [order]/L[abel] 1 (on) / 0 (off)
	XB GGGMMMPPP L 0 set GGGMMMPPP to turn blinking label off.
Example	XB GGGMMMPPP B 1 set GGGMMMPPP to turn blinking border on.

Table 1-2 XB Command

XC	
Function	Set the border of the window (with/without dimming effect), clock, label's background, and text color. B [order] to signify the border of the window. L [label] to signify the label's background color. [NoDimColor] to signify the border's dimming effect. Add [NoDimColor] to remove the border's dimming effect. Just enter NDC to signify NoDimColor .
Format	XC GGGMMPPPP (when PPP is 099 = clock) B [order]/ L [label background]/ T [ext] RRRGGGBBB (red ratio 000–255 , green ratio 000–255 , blue ratio 000–255) (NoDimColor)
Example	<p>XC 001001001 B 000255000 set the border color of group 1, module 1, window 1, as green with dimming effect.</p> <p>XC 002002002 B 255000000 ndc set the border color of group 2, module 2, window 2, as red but without dimming effect.</p> <p>XC 003003003 L 000000255 set the label background color of group 3, module 3, window 3, as blue with dimming effect.</p> <p>XC 002002099 B 255000255 set the digital clock border color of group 2, module 2, as pink.</p> <p>XC 001001099 L 255000255 set the clock label background color of group 1, module 1, as pink.</p>

Table 1-3 XC Command

XF	
Function	Turn on/off the video window's full screen mode.
Format	XF GGGMMPPPP full screen mode 1 (on) / 0 (off)
Example	<p>XF 001001004 1 set group 1, module 1, window 4, to full screen mode display.</p> <p>XF 001001004 0 disable full screen mode for group 1, module 1, window 4, and revert it back to its former display size.</p>

Table 1-4 XF Command

XI	
Function	Set the input channel for the video window.
Format	XI GGGMMPPPP (where PPP is 1–4 = window) [video input source 1–8 channel]
Example	XI GGGMMM000 1 set GGGMMM all windows to have channel 1 as the input source.

Table 1-5 XI Command

XK	
Function 1	Set the time and method of counting (free run mode only). "000" is the fixed value for PPP in XK command.
Format	XK GGGMMMPPP P [reset] S [et]/ L [oad] Preset ID (1–8) HH MM SS
Example	XK GGGMMMPPP P S 1 11 22 33 sets GGGMMMPPP's preset time ID1 = 11:22:33.
	XK GGGMMMPPP P L 1 sets GGGMMMPPP's time to be the same as preset time of ID1.
Function 2	Broadcast the master clock's time. Moving video is composed of a number of frames transmitted every second that combine in the viewer's mind to create the illusion of movement. The nominal rate for film is 24 frames per second, while the rate for video is 30 frames per second.
Format	XK GGGMMMPPP B [roadcast] HH [our] MM [inute] SS [econd] FF [rame number]
Example	XK GGGMMMPPP B 11 22 33 00 sets GGGMMMPPP to broadcast (sync) the master clock's time as 11:22:33:00.
Function 3	Select the clock input (source) and set the format for control.
Format	XK GGGMMMPPP S [ource] 0 (RTC) / 1 (SNTP) / 2 (LTC) / 3 (free run – use current time as timer source) / 4 (sync to master) [HH MM SS] 0 (count up) / 1 (count down) [counting method – free run mode only] 0 (hide frame number) / 1 (show frame number) [LTC or sync to master mode only]
Example	XK GGGMMMPPP S 3 1 sets GGGMMMPPP free run as time source and count down as counting method.
	XK GGGMMMPPP S 0 sets GGGMMMPPP RTC as time source.
	XK GGGMMMPPP S 2 1 sets GGGMMMPPP LTC as time source and show frame number.
Function 4	Set the calibration time and sync time to master module.
Format	XK GGGMMMPPP C [alibrate] [time period] (in seconds) 0 (do not sync time to master module) / 1 (sync time to master module)]
Example	XK GGGMMMPPP C 3600 0 execute calibration in 3,600 seconds and do not sync clock to master module.
	XK GGGMMMPPP C 60 1 execute calibration in 60 seconds and sync clock to master module.
Function 5	Turn on/off the clock display (includes when in full screen mode) and set the clock's transparency to background.
Format	XK GGGMMMPPP O [n/off] [clock display 0 (off) / 1 (on)] [when in full screen mode 0 (clock is off) / 1 (clock is on)] [digital clock to background 0 (fully transparent) to 8 (not transparent)]
Example	XK GGGMMMPPP O 1 1 0 sets GGGMMMPPP to display the digital clock, clock is on when in full screen mode, and set to full transparency.
	XK GGGMMMPPP O 0 0 0 sets GGGMMMPPP to turn off the clock.

Turn on/off daylight saving time and adjust the clock's time zone ID.

ID	Time Zone
0	(GMT-12:00) Eniwetok, Kwajalein
1	(GMT-11:00) Midway Island, Samoa
2	(GMT-10:00) Hawaii
3	(GMT-09:00) Alaska
4	(GMT-08:00) Pacific Time (US and Canada); Tijuana
5	(GMT-07:00) Arizona
6	(GMT-07:00) Mountain Time (US and Canada)
7	(GMT-06:00) Central America
8	(GMT-06:00) Central Time (US and Canada)
9	(GMT-06:00) Mexico City
10	(GMT-06:00) Saskatchewan
11	(GMT-05:00) Bogota, Lima, Quito
12	(GMT-05:00) Eastern Time (US and Canada)
13	(GMT-05:00) Indiana (East)
14	(GMT-04:00) Atlantic Time (Canada)
15	(GMT-04:00) Caracas, La Paz
16	(GMT-04:00) Santiago
17	(GMT-03:30) Newfoundland
18	(GMT-03:00) Brasilia
19	(GMT-03:00) Buenos Aires, Georgetown
20	(GMT-03:00) Greenland
21	(GMT-02:00) Mid-Atlantic
22	(GMT-01:00) Azores
23	(GMT-01:00) Cape Verde Island
24	(GMT) Casablanca, Monrovia
25	(GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London
26	(GMT+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna
27	(GMT+01:00) Belgrade, Bratislava, Budapest, Ljubljana, Prague
28	(GMT+01:00) Brussels, Copenhagen, Madrid, Paris
29	(GMT+01:00) Sarajevo, Skopje, Sofia, Vilnius, Warsaw, Zagreb
30	(GMT+01:00) West Central Africa
31	(GMT+02:00) Athens, Istanbul, Minsk
32	(GMT+02:00) Bucharest
33	(GMT+02:00) Cairo
34	(GMT+02:00) Harare, Pretoria
35	(GMT+02:00) Helsinki, Riga, Tallinn
36	(GMT+02:00) Jerusalem
37	(GMT+03:00) Baghdad
38	(GMT+03:00) Kuwait, Riyadh
39	(GMT+03:00) Moscow, St. Petersburg, Volgograd
40	(GMT+03:00) Nairobi
41	(GMT+03:30) Tehran
42	(GMT+04:00) Abu Dhabi, Muscat
43	(GMT+04:00) Baku, Tbilisi, Yerevan
44	(GMT+04:30) Kabul
45	(GMT+05:00) Ekaterinburg
46	(GMT+05:00) Islamabad, Karachi, Tashkent
47	(GMT+05:30) Calcutta, Chennai, Mumbai, New Delhi
48	(GMT+05:45) Kathmandu
49	(GMT+06:00) Almaty, Novosibirsk
50	(GMT+06:00) Astana, Dhaka
51	(GMT+06:00) Sri Jayawardenapura
52	(GMT+06:30) Rangoon
53	(GMT+07:00) Bangkok, Hanoi, Jakarta
54	(GMT+07:00) Krasnoyarsk
55	(GMT+08:00) Beijing, Chongqing, Hong Kong, Urumqi
56	(GMT+08:00) Irkutsk, Ulaanbaatar
57	(GMT+08:00) Kuala Lumpur, Singapore
58	(GMT+08:00) Perth
59	(GMT+08:00) Taipei
60	(GMT+09:00) Osaka, Sapporo, Tokyo
61	(GMT+09:00) Seoul
62	(GMT+09:00) Yakutsk
63	(GMT+09:30) Adelaide
64	(GMT+09:30) Darwin
65	(GMT+10:00) Brisbane
66	(GMT+10:00) Canberra, Melbourne, Sydney
67	(GMT+10:00) Guam, Port Moresby
68	(GMT+10:00) Hobart
69	(GMT+10:00) Vladivostok
70	(GMT+11:00) Magadan, Solomon Island, New Caledonia
71	(GMT+12:00) Auckland, Wellington
72	(GMT+12:00) Fiji, Kamchatka, Marshall Island
73	(GMT+13:00) Nuku'alofa

Function 6

XK	
Format	XK GGGMMPPPP D [aylight saving time] 0 (off) / 1 (on) [time zone ID] <i>Note: Before setting daylight saving time/time zone ID, set RTC (0) as the time source (refer to function 3 above).</i>
Example	XK GGGMMPPPP D 1 32 turn on GGGMMPPPP's daylight saving time, and set Bucharest as the clock's time zone. XK GGGMMPPPP D 1 59 turn on GGGMMPPPP's daylight saving time, and set Taipei as the clock's time zone. XK GGGMMPPPP D 0 turn off GGGMMPPPP's daylight saving time.
Function 7	Select the digital or analog clock display mode.
Format	XK GGGMMPPPP A [analog] 1 (on = analog clock mode) / 0 (off = digital clock mode) 1–5 [analog clock bitmap ID display mode]
Example	XK GGGMMPPPP A 1 2 sets GGGMMPPPP to use the analog clock bitmap ID #2 display mode. XK GGGMMPPPP A 0 set GGGMMPPPP to use the digital clock display mode.
Function 8	Set the RTC timer's 24-hour clock format.
Format	XK GGGMMPPPP R [TC] HH [our] MM [minute] SS [second]
Example	XK GGGMMPPPP R 11 22 33 set GGGMMPPPP RTC timer as 11:22:33.

Table 1-6 XK Command

XL	
Function	Set the label's text, font size, and position inside/outside video.
Format	XL GGGMMPPPP (when PPP is 099 = clock) " TEXT " (label text string 32 ASCII characters maximum) [font size = 0 (maintain current size and label inside video) / 1–4 (font size and label inside video) / 128 (maintain current size and label outside video) / 129–132 (equivalent to font size 1–4 and label outside video)]
Example	XL 00000000 " CNN News Station " set all windows labels with text " CNN News Station "
Example	XL 00000000 3 set all windows labels with font size 3.
Example	XL 001002099 3 set group 1, module 2 clock's label with font size 2.
Example	XL 00000000 " CNN News Station " 128 set all windows labels with text " CNN News Station " and label outside video.

Table 1-7 XL Command

XM

Change the output resolution, the resolution number refers to the list of resolutions that Rainier 3G supports.

Function	Resolution	Vertical Frequency		
		50 Hz	60 Hz	75 Hz
	1024 × 768	31	2	11
	1280 × 720	30	15	48
	1280 × 768	32	22	49
	1280 × 1024	29	9	12
	1360 × 768	38	20	21
	1400 × 1050	34	35	50
	1440 × 900	46	45	51
	1600 × 1200	39	10	52
	1680 × 1050	41	40	53
	1920 × 1080	28	26	N/A
	1920 × 1200	37	36	N/A

Format	XM GGGMMPPP ## (resolution number) 1 (normal) / 0 (VESA) output timing. For XM command, only GGG is used. MMM and PPP are not applicable.
Example	<p>XM 001000000 10 0 set all the modules in group 1 to display at 1600×1200 resolution at 60Hz vertical frequency, and VESA output timing mode.</p> <p>XM 000000000 9 1 set all the modules in all the groups to have a 1280×1024 resolution at 60Hz vertical frequency, and normal output timing mode.</p>

Table 1-8 XM Command
XN

Function	Turn on/off the alarm, border, AFD, label, meter, aspect ratio, safe area, user logo in foreground, video format display, and window. Option I[info AFD] allows the addition of AFD ID (active format description identification) into video format string.
Format	XN GGGMMPPP (when PPP is 099 = clock; 098 = user logo) (A [larm]/ B [order]/ I [info AFD]/ L [abel]/ M [eter]/ R [atio aspect]/ S [afe area]/ U [ser logo in foreground]/ V [ideo format display]/ W [indow]) 1 (on) / 0 (off)
Example	<p>XN GGGMMM099 W 0 turn GGGMMM clock off.</p> <p>XN GGGMMPPP B 1 turn GGGMMPPP border on.</p>

Table 1-9 XN Command
XO

Function	Set the audio output. PPP can only be 000 , when outputting to a particular window and particular channel's audio; it will be based on the device's saved setting. When it cannot be determined then enter the value directly.
Format 1	<p>For initializing the audio and setting the window's meter source: XO GGGMMPPP I[nitalize] 1-4 (Lgroup – for SDI input's embedded audio, group 1-4) 1-4 (Rgroup – for SDI input's embedded audio, group 1-4) / 5 (or AES) 1 (VU ballistics) / 2 (PPM)</p> <p><i>Note: DO NOT select the same SDI group number for Lgroup and Rgroup.</i></p>

XO	
Example	XO GGGMMPPPI 1 5 1 set GGGMMPPPI Lgroup = 1 Rgroup = AES and VU ballistics.
Format 2	For setting the control board's S/PDIF audio output: XO GGGMMPPPI O[output] [select 1 (main board S/PDIF) / 2 (control board cascade S/PDIF)] [source 0 (mute) / 1 (cascade video) / 2 (analog audio to digital converter / AES) / 3 (window 1) / 4 (window 2) / 5 (window 3) / 6 (window 4)] [channel number 1/2/3/4] [sound 1 (stereo) / 2 (mono right) / 3 (mono left)]
Example	XO 002002000 O 1 3 2 1 set the audio output of group 2, module 2 to select main board S/PDIF, source from window 1, channel 2, and stereo sound. XO 002002000 O 2 set the audio output of group 2, module 2 to select the control board cascade S/PDIF

Table 1-10 XO Command

XP	
Function	Load a previously saved preset or save current layout to a preset. Load or save latest configuration to system files ("Latest" and "Module.sys"). If the filename is not specified when saving the file, system will not backup the file into flash memory.
Format	XP GGGMMPPPI L[oad] / S[ave] filename.GP# / Latest ("Latest" system file / LatestAll (both "Latest" and "Module.sys" system files)
Example	XP 001000000 L Group 1.GP1 set all the modules in group 1 to load the previously saved Group 1.GP1 preset file <i>Note: Input of filename is not case-sensitive.</i> XP 002000000 S Group 2.GP2 save the current layout of all modules in group 2 to a preset file Group 2.GP2 XP 001000000 S LatestAll save the current layout of all modules in group 1 into "Latest" and "Module.sys" system files.

Table 1-11 XP Command

XR	
Function	Lock and adjust the aspect ratio. AFD stands for Active Format Description.
Format	XR GGGMMPPPI [0 (off) / 1 (automatic aspect ratio on and use the manual aspect ratio value) / 3 (video embedded AFD aspect ratio on) / 5 (use the manual aspect ratio and set window size to fit aspect ratio) / 7 (use the video embedded AFD aspect ratio and set window size to fit aspect ratio)] [SD video (width ratio) (height ratio)] [HD video (width ratio) (height ratio)]

XR	
	<p>XR GGGMMM001 1 4 3 16 9 set GGGMMM001 SD video ratio as 4:3, HD video ratio as 16:9.</p> <p>XR 00000000 1 16 9 4 3 set all windows' SD video ratio as 16:9, HD video ratio as 4:3.</p>
Example	<p>XR GGGMMPPPP 1 7 12 7 12 set GGGMMPPPP's SD and HD video ratio as 7:12.</p> <p>XR GGGMMPPPP 0 disable the function.</p> <p>XR GGGMMPPPP 7 set the AFD aspect ratio on and set the window size to fit this aspect ratio.</p>

Table 1-12 XR Command

XS	
Function	Set the label or meter's transparency. All windows will share the same label transparency setting. That is, upon changing one window's label transparency, all other window's label transparency will also be changed simultaneously.
Format	XS GGGMMPPPP [L[abel] / M[eter]] [0 (fully transparent) – 8 (not transparent)]
Example	<p>XS 001002000 L 8 set all window labels of group 1, module 2 to no transparency.</p> <p>XS 001000000 M 3 set all modules' meter in group 1 to transparency level 3.</p>

Table 1-13 XS Command

XT	
Function	Turn on or off the tally for a window or all the windows in a group.
Format	XT GGGMMPPPP [0 is all tally / 1–3 = tally 1–3] [1 (on) / 0 (off)]
Example	<p>XT 001002003 2 1 activate tally 2 for window 3 in module 2 for group 1.</p> <p>XT 001000000 0 0 close tally for all windows of all modules for group 1.</p>

Table 1-14 XT Command

XU	
Function	Set the umd (under monitor display) label's text string. "000" is the fixed value for PPP in XU command. <i>Note: Make sure to set the Phoenix-Q Utility Properties portion's Label/Display Type to UMD before using the XU command.</i>
Format	XU GGGMMPPPP [0 is all video input ports / 1–8 = video input port number] "TEXT" (always center-aligned, supports ASCII characters only – include the quotation marks)
Example	<p>XU 001002000 2 "UMD Label" set group 1, module 2, use video input port number 2, umd label's text string as "UMD Label."</p>

Table 1-15 XU Command

XV	
Function	Set the S/PDIF audio's volume level. "000" is the fixed value for PPP in XV command.
Format	XV GGGMMMPPP 1 (on) / 0 (off) [percentage of volume level 0–399]
Example	<p>XV GGGMMM000 0 turn GGGMMMPPP's S/PDIF audio to mute.</p> <p>XV GGGMMM000 1 50 turn GGGMMMPPP's S/PDIF audio volume to half of input.</p> <p>XV GGGMMM000 1 100 turn on GGGMMMPPP's S/PDIF audio volume (maintain level).</p> <p>XV GGGMMM000 1 200 turn GGGMMMPPP's S/PDIF audio volume to double of input.</p> <p>XV GGGMMM000 1 300 turn GGGMMMPPP's S/PDIF audio volume to triple of input.</p> <p>XV GGGMMM000 1 399 turn GGGMMMPPP's S/PDIF audio volume to nearly quadruple of input.</p>

Table 1-16 XV Command

XW	
Function	Set the window's position and size. Both position (X and Y) and size [W (idth) and H (eight)] are expressed in pixel unit. Size entry [W (idth) and H (eight)] is optional. For the user logo, only the position parameters (X and Y) are used. To prevent distortion on the window's image (for "interlaced" input signal), make sure the height of the image (excluding label and border) IS NOT smaller than one-half of the vertical active region of input source (e.g., if resolution is set at 1080i 50Hz then the image's height must not be less than 540 pixels).
Format	<p>XW GGGMMMPPP (when PPP is 099 = clock; 098 = user logo / 1–4 = video window number) X position Y position W(idth) H(eight)</p> <p><i>Note:</i></p> <ol style="list-style-type: none"> 1. 000 for PPP cannot be used to pertain to all window assignments. A valid window ID must be assigned (001–004). 2. When PPP is 099 (clock) or PPP is 098 (user logo) then H(eight) has no function.
Example	<p>XW GGGMMMPPP 100 200 960 540 set GGGMMMPPP at (100,200) top-left position and (960,540) width, height.</p>

Table 1-17 XW Command

Appendix A Using the ASCII Test Utility

A proprietary Avitech ASCII Test utility can simplify the creation of BIN file, loading of previously saved BIN file, as well as generating two types of text files (for use on third-party programs).

To use the ASCII Test utility, perform the following steps:

Step 1. Double-click the “ASCII_Test.exe” file.

Step 2. Click the “X ASCII” checkbox.

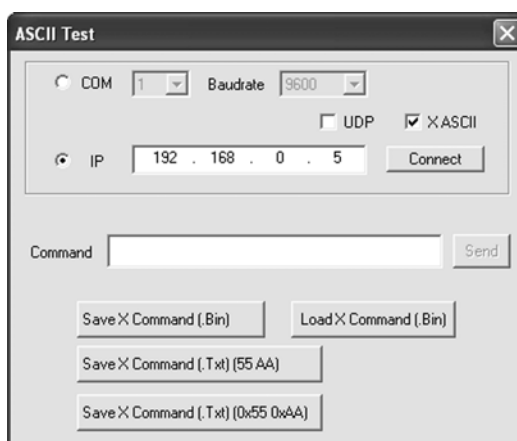



Figure A-1 ASCII Test Utility: Click “X ASCII” Checkbox

Step 3. Enter the correct **IP** address assigned to your Avitech device.

Step 4. Click **Connect**.

Step 5. Type **XL 00000000 3** (set all windows labels with font size 3) in **Command** window.

Step 6. Click **Send**.

 Performing the below steps allows you to save often used X commands and load for later use.

Step 7. Click **Save X Command (.Bin)** to generate and save the **XL 00000000.bin** file for re-use or use with third-party utility.

Step 8. Click **Load X Command (.Bin)** to load previously saved Bin file. **XL 00000000 3** would automatically appear in the **Command** window. Then click **Send**.

Step 9. Click **Save X Command (.Txt) (55 AA)** to generate the sample (first type) binary text string (text file) below for use with a third-party utility.

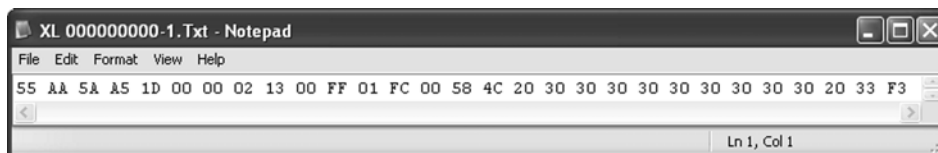


Figure A-2 Sample Binary Text String – (First Type)

Step 10. Click `Save X Command (.Txt) [0x55 0xAA]` to generate the sample (second type) binary text string (text file) below for use with a third-party utility.



Figure A-3 Sample Binary Text String – (Second Type)

Appendix B ASCII X Command Through TCP/IP Programming

B.1 Starting TCP Connection

Step 1. Obtain IP address of device to connect to.

Step 2. Use this IP address to effect TCP connection with device. Upon establishing connection, device will send out a successful connection message. Message will include Frame ID.

- ✓ *During PC software communication with control board firmware via TCP, control board firmware functions as TCP server while PC software functions as TCP client. Take note of the following TCP communication properties:*
 - *TCP port number is fixed at 20036.*
 - *TCP server's control board firmware can allow simultaneous connection to 3 TCP client (maximum).*
- ✓ *Initially upon establishing connection between TCP server's control board firmware and TCP client, TCP server will acknowledge successful connection or failure. TCP client must then make the appropriate response.*

B.2 Connection is Successful

Control board will reply to TCP client using below 17-bytes message:

0xA5 0x5A 0xAA 0x55 0x11 0x00 0x00 0x01 0x80 0x01 0x00 0x00 (FrameID) (~FrameID)
 Machine_Type MB_Exist_Flag SocketID (17 bytes)

Above message is comprised of the following parts:

- Byte 0~3: Header is fixed at 0xA5 0x5A 0xAA 0x55.
- Byte 4~5: Return message length is 0x11 0x00 (use "little-endian" expression), this means that length of message is 17 bytes.
- Byte 6: field is reserved for control board firmware use only, TCP client should ignore this field.
- Byte 7~8: is Command ID, it is fixed at 0x01 0x80.
- Byte 9: is "Ack" field, when fixed at 0x01 this means that TCP connection is successfully established.
- Byte 10~11: is fixed at 0x0000.
- Byte 12: Frame ID.
- Byte 13: bit inverse of Frame ID.
- Byte 14: Machine type: 0 = Rainier 3G 1 = Rainier 3G Quad 2 = Rainier 3G Plus / Titan 9000
- Byte 15: MB existence flag: 0 = MB does not exist 1 = MB do exist
 bit[0:3]: MB1 ~ MB4 existence flag

- Byte 16: Socket ID – TCP socket ID used by control board to effect present connection.

B.3 Connection is Not Successful

Due to the fact that only 3 TCP connections is simultaneously allowed on TCP server's control board, when a fourth TCP client tries to request for connection, then TCP server's control board will reply with the following 14-bytes message to TCP client, informing client that number of allowed connection is inadequate and so is unable to establish connection:

0xA5 0x5A 0xAA 0x55 0x0E 0x00 0x00 0x01 0x80 0x00 0x11 0x00 (FrameID) (~FrameID) (14 bytes)

After PC's TCP client has received this return message, existing connection to TCP socket in PC's software should be closed.

B.4 Maintaining TCP Connection

Because control board's TCP Server connection has an 8-minute timeout limit, if during this duration and no (any) TCP message packet is transmitted to control board, then control board will automatically disconnect the TCP connection. Therefore, in order to avoid lengthy period of "TCP idle" state, PC should periodically transmit TCP/IP packet (within 8-minute time interval). Packet can be a typical control board command, or a TCP Ping command, or a simple "keep alive" packet (PC Windows system's TCP "Keep Alive" function can be activated to be able to automatically transmit periodic "keep alive" packet).

B.5 Command Protocol

Format of command protocol used by PC's software to transmit command to Rainier 3G's control board is as follows:

Byte Size	4	2	1	2	2	1	N (option)	1	M (option)	1
Field	Header	CMD Length	Reserved	CMD ID	Frame ID	Module ID Length	Module ID	Protocol Number	Parameter	Checksum

Table B-1 Command Protocol Format

Above table is comprised of the following parts:

Byte Order	Length (Byte)	Field	Description
0	1	0x55	Fixed Header
1	1	0xAA	Fixed Header
2	1	0x5A	Fixed Header
3	1	0xA5	Fixed Header
4~5	1	Command length	Total command length (little-endian format). Total length refers to start of "header" (includes header) up to "command" end (includes Checksum Byte). Unit: Byte.
6	1	Reserved	Default value is 0x00, used in the control board firmware.
7	1	Command ID Category	Represents a specific class category of command.
8	1	Command ID (Number)	"Command ID number" refers to a specific command in a command category.
9	—	Frame ID	Frame ID value = 0x00 ~ 0x0E (0x0F is reserved for system factory-default mode use, in normal usage the Frame ID cannot be set at 0x0F). This value refers to the device's rear panel rotary ID setting, indicating that command is to be transmitted to this device.
10	—	Inverse Frame ID	Refers to upper Frame ID's 8 bits, each bit is the inverse value (0,1 interchanged)
11	1	Module ID Byte length	Fixed at 0x01
12	1	Module_ID	Module ID
13	1	Processor Number (Window)	Refers to video window that will receive command. When this field is not used, should be set at default value 0x00.
—	N	Parameter	Refers to the field for command parameter (when no parameter is to be transmitted, this field does not need to be present).
—	1	Checksum	Method for computing Checksum value must start from Byte 0 up to the last byte (does not include the Check_sum byte itself).

Table B-2 Parts Description of Command Protocol

B.6 Error Codes

Any error that occurs after binary command execution will cause firmware to transmit a 2-byte error code to PC software. Error code list is as follows (second byte is fixed at 0x00):


Error Code	Description
0x01	Command parsing error or command format error.
0x02	Command checksum error.
0x03	Frame_ID does not match.
0x04	Module_ID / Module ID length does not match.
0x05	Module style or sub-module style does not match real device.
0x06	No such module – module specified in the command does not exist.
0x07	No such sub-module – sub-module specified in the command does not exist.
0x08	No such processor – processor specified in the command does not exist.
0x09	Command received is incomplete.
0x0A	Device (module or sub-module) does not support this command.
0x0B	This command does not support Multicast/Broadcast command type (module ID field must be less than 0xC0).
0x0C	Cannot execute command in this module (this does not mean that the command is not supported; but rather, when the module is in a selected "state" will cause a specific command to be unsupported).
0x0D	Command execution failed.
0x0E	File already exist (filename already in use).
0x0F	File does not exist (when using "writeFile" command during "continue_write" or "end_write" – it was determined that file does not exist – this could mean that it was not created properly or deletion occurred during "write."
0x10	Reserved
0x11	Number of TCP connection has exceeded system limit (default is up to 3 simultaneous TCP client connection only).
0x12	Flash memory space is full (inadequate flash memory space is available for file storage).
0x13	Data already exist in flash memory location so subsequent writes is not allowed (this error may be caused by faulty "write address" or "write length" during "flash write").
0x14	File CRC-16 check error (during file write)
0x15	Already in read file state (file reading is now in progress, must wait for file read to terminate before reading another file is allowed).
0x16	Writing file size is over the 65535 bytes limit (example, "user-defined file" has this limit).
0x17	File size is over the 8192 bytes limit (example, "preset file" and "latest file" has this limit).
0x18	Not a valid "preset file" or "latest file" (file size and required length of data structure in device is not identical)
0x19	File size has exceeded the maximum limit (file size has exceeded the 1.5MB limit – SLI8668 firmware has this limitation).
0x1A	Invalid input parameter.
0x1B	"Display Group ID" entered does not conform to the present MB module setting.
0x1C	"Display Module ID" entered does not conform to the present MB module setting.
0xFF	Undefined cause of error.

Table B-3 Error Codes

B.7 Packing ASCII X Command to Binary Command Format

Function: to send ASCII X command via TCP/IP. Command format is comprised of the following parts:

- Byte 0~3: 0x55 0xAA 0x5A 0xA5 – header pattern is fixed.
- Byte 4~5: Command total length (use “little-endian” expression).
- Byte 6: 0x00 – fix value to 0x00 (reserved field.)
- Byte 7~8: 0x02 0x13 – fix value to 0x02 0x13 (Command ID field)
- Byte 9: 0x00 – fix value to 0x00 (no need to assign a Frame ID)
- Byte 10: 0xFF – fix value to 0xFF (inverse of Frame ID field)
- Byte 11: 0x01 – fix value to 0x01.
- Byte 12: 0xFC – fix value to 0xFC (Module ID of ALL_MB_MODULE.)
- Byte 13: 0x00 – fix value to 0x00.
- Byte 14~ :ASCII command string (N bytes)
- Byte (14+N-1): Checksum byte.


 | *This command does not return any message to PC software.*

B.7.1 Example

Original ASCII X command string = XN 001003001 E 1
 (set chassis/frame “1” card/module “3” window “1” label outside the image)

After packing the ASCII X command into binary format:

55 AA 5A A5 1F 00 00 02 13 00 FF 01 FC 00 58 4E 20 30 30 31 30 30 33 30 30 31 20 45 20 31 5F

 | *The last byte “0x5F” in the above binary stream is the Checksum byte.*