Avitech ASCII X Commands

(For Rainier 3G Plus/Quad / Titan 9000)

ABOUT THIS REFERENCE GUIDE
This reference guide contains information about how to use the Avitech ASCII Protocol (AAP) of Rainier 3G Plus/ Quad / Titan 9000.

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**.

To assist us in making improvements to this reference guide, we welcome any comments and constructive criticism. Please send all such – in writing to: sales@avitechvideo.com.

WARNING
Do not attempt to disassemble the Avitech device(s). Doing so may void the warranty. There are no serviceable parts inside. Please refer all servicing to qualified personnel.

TRADEMARKS
All brand and product names are trademarks or registered trademarks of their respective companies.

TECHNICAL SUPPORT
For any questions regarding the information provided in this guide, call our technical support help line at 425-885-3863, or our toll free help line at 1-877-AVI-TECH, or email us also at support@avitechvideo.com

Contents

Warranty

Avitech International Corporation (herein after referred to as "Avitech") warrants to the original purchaser of the products manufactured in its facility (the "Product"), that these products will be free from defects in material and workmanship for a period of 1 year or 15 months from the date of shipment of the Product to the purchaser. There is a 3 month grace period between shipping and installation.

If the Product proves to be defective during the 1 year warranty period, the purchaser's exclusive remedy and Avitech's sole obligation under this warranty is expressly limited, at Avitech's sole option, to:
(a) repairing the defective Product without charge for parts and labor; or (b) providing a replacement in exchange for the defective Product; or (c) if after a reasonable time is unable to correct the defect or provide a replacement Product in good working order, then the purchaser shall be entitled to recover damages subject to the limitation of liability set forth below.

Limitation of Liability

Avitech's liability under this warranty shall not exceed the purchase price paid for the defective product. In no event shall Avitech be liable for any incidental, special, or consequential damages, including without limitation, loss of profits for any breach of this warranty.

If Avitech replaces the defective Product with a replacement Product as provided under the terms of this Warranty, in no event will the term of the warranty on the replacement Product exceed the number of months remaining on the warranty covering the defective Product. Equipment manufactured by other suppliers and supplied by Avitech carries the respective manufacturer's warranty. Avitech assumes no warranty responsibility either expressed or implied for equipment manufactured by others and supplied by Avitech.

This Warranty is in lieu of all other warranties expressed or implied, including without limitation, any implied warranty of merchantability or fitness for a particular purpose, all of which are expressly disclaimed.

This Hardware Warranty shall not apply to any defect, failure, or damage: (a) caused by improper use of the Product or inadequate maintenance and care of the Product; (b) resulting from attempts by other than Avitech representatives to install, repair, or service the Product; (c) caused by installation of the Product in a hostile operating environment or connection of the Product to incompatible equipment; or (d) caused by the modification of the Product or integration with other products when the effect of such modification or integration increases the time or difficulties of servicing the Product.

Any Product which fails under conditions other than those specifically covered by the Hardware Warranty, will be repaired at the price of parts and labor in effect at the time of repair. Such repairs are warranted for a period of 90 days from date of reshipment to customer.

Extended Warranty Options

Avitech offers OPTIONAL Extended Warranty plans that provide continuous coverage for the Product after the expiration of the Warranty Period. Contact an Avitech sales representative for details on the options that are available for the Avitech equipment.

Services and Repairs Outside the Warranty Period

Avitech makes its best offer to repair a product that is outside the warranty period, provided the product has not reached its end of life (EOL). The minimum charge for such repair excluding shipping and handling is $200 (US dollars).

AVITECH INTERNATIONAL CORPORATION
● 15377 NE 90th Street Redmond, WA 98052 USA
● TOLL FREE 1 877 AVITECH
● PHONE 1 425 885 3863
● FAX 1 425 885 4726
● info@avitechvideo.com
● http://avitechvideo.com

Regulatory Information

Marking labels located on the exterior of the device indicate the regulations that the model complies with. Please check the marking labels on the device and refer to the corresponding statements in this section. Some notices apply to specific models only.

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Avitech is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

European Union CE Marking and Compliance Notices
Statements of Compliance

English
This product follows the provisions of the European Directive 1999/5/EC.

Dansk (Danish)
Dette produkt er i overensstemmelse med det europæiske direktiv 1999/5/EC.

Nederlands (Dutch)
Dit product is in navolging van de bepalingen van Europees Directief 1999/5/EC.

Suomi (Finnish)
Tämä tuote noudattaa EU-direktiivin 1999/5/EC määräyksiä.

Français (French)
Ce produit est conforme aux exigences de la Directive Européenne 1999/5/EC.

Deutsch (German)
Dieses Produkt entspricht den Bestimmungen der Europäischen Richtlinie 1999/5/EC.

Ελληνικά (Greek)
Το προϊόν αυτό πληροί τις προβλέψεις της Ευρωπαϊκής Οδηγίας 1999/5/EC.

Íslenska (Icelandic)
Þessi vara stenst reglugerð Evrópska Efnahags Bandalagsins númer 1999/5/EC.

Italiano (Italian)
Questo prodotto è conforme alla Direttiva Europea 1999/5/EC.

Norsk (Norwegian)
Dette produktet er i henhold til bestemmelsene i det europeiske direktivet 1999/5/EC.

Português (Portuguese)
Este produto cumpre com as normas da Diretiva Européia 1999/5/EC.

Español (Spanish)
Este producto cumple con las normas del Directivo Europeo 1999/5/EC.

Svenska (Swedish)
Denna produkt har tillverkats i enlighet med EG-direktiv 1999/5/EC.

Australia and New Zealand C-Tick Marking and Compliance Notice
Statement of Compliance

This product complies with Australia and New Zealand's standards for radio interference.

1. ASCII X Command

The Rainier 3G Plus/Quad / Titan 9000 supports the ASCII X command prompt interface through Ethernet port (**IP**) only.
This chapter discusses using the Avitech ASCII Protocol (AAP) of Rainier 3G Plus/Quad / Titan 9000.

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 1-1 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 Connection through Ethernet Port

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.

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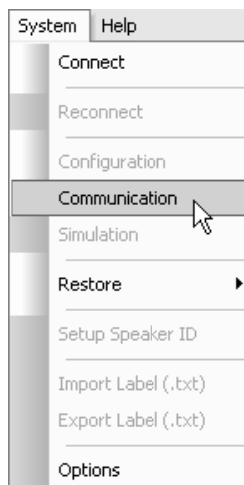

Figure 1-2 Phoenix-Q Utility: System→Communication

This operation is not available when the computer is connected to the Rainier 3G Plus/Quad / Titan 9000 multiviewer.

*Step 2. Make sure to specify the correct IP address of selected Rainier 3G Plus/Quad / Titan 9000, and click **Add to List** to continue.*
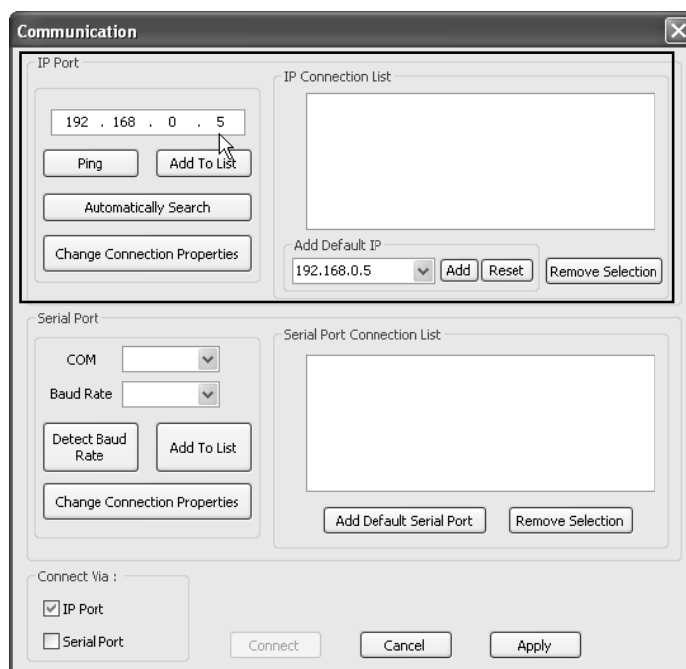

Figure 1-3 Phoenix-Q Utility: Enter IP Address

*Step 3. Click **Apply** to activate the setting and click **Cancel** to exit 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:

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

Table 1-1 XB Command

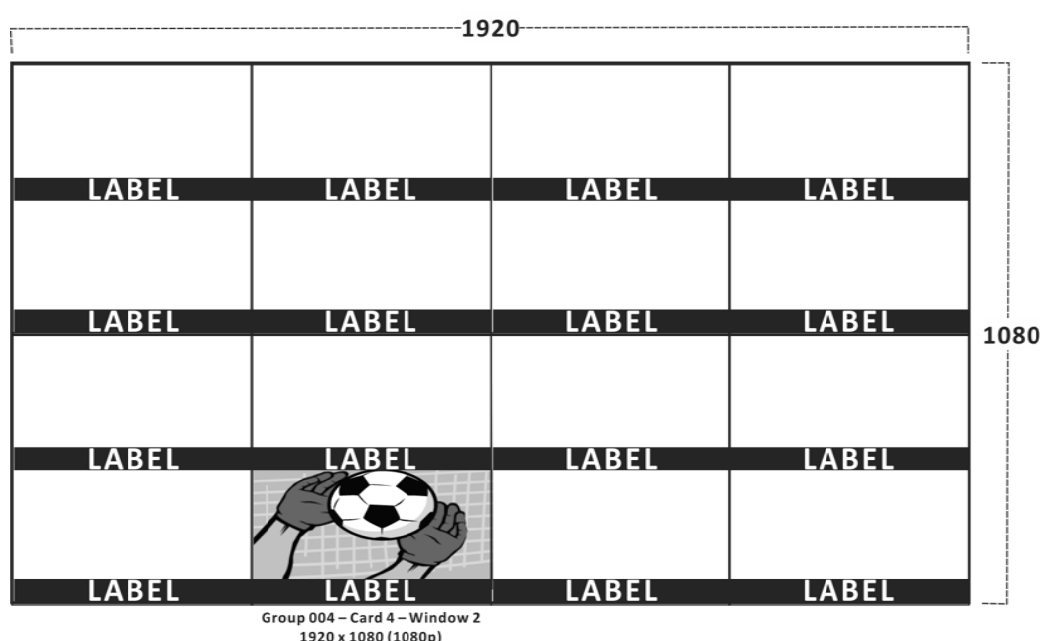| XC	
Function	Set the border of the window (with/without dimming effect), clock, label's background, and text color. **B**[order] to signify the border of the window. **L**[abel] to signify the label's background color. [**N**o**D**im**C**olor] to signify border's dimming effect. Add [**N**o**D**im**C**olor]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

Table 1-2 XC Command

XF	
Function	Turn on/off the video window's full screen mode.
Format	**XF GGGMMMPPP** full screen mode **1** (on) / **0** (off) _Note: GGGMMMPPP must not be "000" for XF command._
Example	**XF 001001004 1** set group 1, module 1, window 4, to full screen mode display. **XF 001001004 0** disable full screen mode for group 1, module 1, window 4, and revert it back to its former display size.

Table 1-3 XF Command

📄 _The below sample illustration for ASCII XG command is taken from a window of a sample multi-window output monitor display._

Group 004 – Card 4 – Window 2
1920 x 1080 (1080p)

XG	
Function	Set the crop (zoom in) position and size (in pixel unit). When cropping (zooming in), the width and height are calculated using the output display size.
Format	**XG GGGMMMPPP X** position **Y** position **W**(idth) **H**(eight) "001"~"004" (pertains to window 1~4) are the possible values for **PPP** in XG command.
Example	**XG GGGMMMPPP 960 540 960 540** If the output display timing is 1920×1080 at 60Hz, and to zoom in to the right bottom quarter of the input image, set GGGMMMPPP at (960,540) position and crop image (960,540) width height. Crop **X** = 1920 / 2 = 960 Crop **Y** = 1080 / 2 = 540 Crop **W**idth = 1960 / 2 = 960 Crop **H**eight = 1080 / 2 = 540 _Note: Make sure that the value assigned for **W**idth and **H**eight must not exceed the resolution of the output window._ _Crop **X** + Crop **W**idth must be ≤ overall width of output resolution._ _Crop **Y** + Crop **H**eight must be ≤ overall height of output resolution._

XG
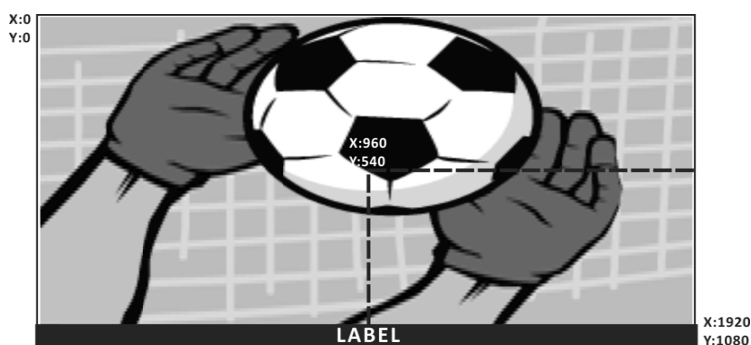
The resulting cropped image will "automatically fill-up the image window."

XG GGGMMMPPP 0 0 960 540
To zoom to (pan) the left top quarter of the input image, set
GGGMMMPPP at (0,0) position and crop image (960,540) width height.

Crop **X** = 0
Crop **Y** = 0
Crop **W**idth = 1960 / 2 = 960
Crop **H**eight = 1080 / 2 = 540

Table 1-4 XG Command

XK

Function 1	Set the time and method of counting (Counter 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** (Counter – use current time as timer source) / **4** (Sync to master) [**HH MM SS**] **0** (count up) / **1** (count down) [counting method – Counter mode only] **0** (hide frame number) / **1** (show frame number) [LTC mode only]
Example	**XK GGGMMMPPP S 3 1** sets GGGMMMPPP counter 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.

Function 6

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, Sofija, 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

XK	
Format	**XK GGGMMMPPP D**[aylight saving time] **0** (off) / **1** (on) [time zone ID]
Example	**XK GGGMMMPPP D 1 32** turn on GGGMMMPPP's daylight saving time, and set Bucharest as the clock's time zone. **XK GGGMMMPPP D 1 59** turn on GGGMMMPPP's daylight saving time, and set Taipei as the clock's time zone. **XK GGGMMMPPP D 0** turn off GGGMMMPPP's daylight saving time.

Table 1-5 XK Command

XL	
Function	Set the label's text, font size, and position inside/outside video.
Format	**XL GGGMMMPPP** (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 000000000 " CNN News Station "** set all windows labels with text " CNN News Station " **XL 000000000 3** set all windows labels with font size 3. **XL 001002099 3** set group 1, module 2 clock's label with font size 2. **XL 000000000 " CNN News Station " 128** set all windows labels with text " CNN News Station "and label outside video.

Table 1-6 XL Command

XM	
Function	Change the output resolution, the resolution number refers to the list of resolutions that Rainier 3G Plus/Quad / Titan 9000 supports.

Resolution	Vertical Frequency			
	50 Hz	59.94 Hz	60 Hz	75 Hz
640 × 480	N/A	N/A	69	N/A
800 × 600	42	N/A	1	47
1024 × 768	31	N/A	2	11
1280 × 720	30	68	15	48
1280 × 768	32	N/A	22	49
1280 × 1024	29	N/A	9	12
1360 × 768	38	N/A	20	21
1400 × 1050	34	N/A	35	50
1440 × 900	46	N/A	45	51
1600 × 1200	39	N/A	10	52
1680 × 1050	41	N/A	40	53
1920 × 1080	28	N/A	26	N/A
1920 × 1200	37	N/A	36	N/A

Note: Only 1280×720 and 1920×1080 50Hz/60Hz output resolution is available when cascading. |
| **Format** | **XM GGGMMMPPP** [**##** (resolution number)] [**1** (normal) / **0** (VESA) output timing]. For **XM** command, only **GGG** is used. **MMM** and **PPP** are not applicable. |
| **Example** | **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.

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. |

Table 1-7 XM Command

XN	
Function	Turn on/off the alarm, border, label's position outside video, AFD, label, meter, OSD, aspect ratio, safe area, test pattern, user logo in foreground, video format display, and window. Option **I**[nfo AFD] allows addition of AFD ID (active format description identification) into video format string. *Note:* *1. The option **I**[nfo AFD] is not available for Titan 9000.* *2. The option **T**[est pattern] is only available for Titan 9000 – (HOB card).*
Format 1	**XN GGGMMMPPP** (when **PPP** is **099** = clock; **098** = user logo) [(**A**[larm]/ **B**[order]/[label's position outsid]**E**/**I**[nfo AFD]/**L**[abel]/**M**[eter]/**O**[SD]/ **R**[atio aspect]/**S**[afe area]/**U**[ser logo in foreground]/**V**[ideo format display]/ **W**[indow])] [**1** (on) / **0** (off)]
Example	**XN GGGMMM099 W 0** turn GGGMMM clock off. **XN GGGMMMPPP B 1** turn GGGMMMPPP border on.
Format 2	**XN GGGMMMPPP T**[est pattern] [**0** (off) / **1** ("line" test pattern) / **2** ("color bar" test pattern) / **3** ("gray scale" test pattern)]
Example	**XN GGGMMM000 T 0** turn Titan 9000-HOB test pattern off. **XN GGGMMM000 T 2** turn Titan 9000-HOB "color bar" test pattern on.

Table 1-8 XN Command

XO	
Function	Initialize the audio and set the window's meter source as well as the audio output.
Format 1	For initializing the audio and setting the window's meter source: **XO GGGMMM000 I**[nitialize] [**1**–**4** (Lgroup – for SDI input's embedded audio, group 1–4)] [**1**–**4** (Rgroup – for SDI input's embedded audio, group 1–4)] [**1** (VU ballistics) / **2** (PPM)]
Example	**XO GGGMMMPPP I 1 4 1** set GGGMMMPPP Lgroup = 1 Rgroup = 4 and VU ballistics.
Format 2	For setting the control board's headphone audio output: **XO GGGMMMPPP O**[utput] [select **1** (control board headphone)] [source **0** (mute) / **3** (window 1) / **4** (window 2) / **5** (window 3) / **6** (window 4)] [channel number **1/2/3/4**] [sound **1** (stereo) / **2** (mono left) / **3** (mono right) / **4** (left and right distributed equally)] *Note*: *1. GGGMMMPPP must not be "000" for XO command.* *2. Using the XO command will not update the setting in Phoenix-Q software. If so desired, change the audio setting in Phoenix-Q to synchronize with ASCII XO command.*
Example	**XO 002002002 O 1 3 2 1** set the audio output of group 2, module 2, window 2 to select control board headphone, source from window 1, channel 2, and stereo sound.

Table 1-9 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 GGGMMMPPP 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 *Note: Input of filename is not case-sensitive.* **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. **XP 001000000 S Latest** save the current layout of all modules in group 1 into "Latest" system file.

Table 1-10 XP Command

XR	
Function	Lock and adjust the aspect ratio. AFD stands for Active Format Description. *Note: The option 3 (video embedded AFD aspect ratio on) and 7 (use the video embedded AFD aspect ratio and set window size to fit aspect ratio) is not available for Titan 9000.*
Format	**XR GGGMMMPPP** [**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)]
Example	**XR GGGMMM001 1 4 3 16 9** set GGGMMM001 SD video ratio as 4:3, HD video ratio as 16:9. **XR 000000000 1 16 9 4 3** set all windows' SD video ratio as 16:9, HD video ratio as 4:3. **XR GGGMMMPPP 1 7 12 7 12** set GGGMMMPPP's SD and HD video ratio as 7:12. **XR GGGMMMPPP 0** disable the function. **XR GGGMMMPPP 7** set the AFD aspect ratio on and set the window size to fit this aspect ratio.

Table 1-11 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 GGGMMMPPP** [**L**[abel] / **M**[eter]] [**1** (transparent) – **8** (not transparent)]
Example	**XS 001002000 L 8** set all window labels of group 1, module 2 to no transparency. **XS 001000000 M 3** set all modules' meter in group 1 to transparency level 3.

Table 1-12 XS Command

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

Table 1-13 XT Command

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

Table 1-14 XU Command

XV	
Function	Set the control board analog audio's volume level. "000" is the fixed value for **PPP** in XV command.
Format	**XV GGGMMMPPP** [volume level **26**–**140** (range equivalent to –102db–12db) therefore 128 is equivalent to 0db volume level]
Example	**XV GGGMMM000 120** set GGGMMM's analog audio volume level at –8db.

Table 1-15 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	**XW GGGMMMPPP** (when **PPP** is **099** = clock; **098** = user logo / **1**–**4** = video window number) **X** position **Y** position **W**(idth) **H**(eight) *Note:* *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	**XW GGGMMMPPP 100 200 960 540** set GGGMMMPPP at (100,200) top-left position and (960,540) width, height.

Table 1-16 XW Command

Refer to Appendix C for more details on using "XW" command.

XX	
Function	When the option "Video Alarm Lock" has been turned "On" in "Properties" portion of Phoenix-Q program, during occurrence of "NO VIDEO" the alarm will remain on screen even after video image signal has resumed streaming from the input source. Use this command to remove "NO VIDEO" text on screen. "000" is the fixed value for **PPP** in XX command.
Format	**XX GGGMMM000 VA_LOCK_CLR 1** (clear) / **0** (not used)
Example	**XX GGGMMM000 VA_LOCK_CLR 1** Clear all "NO VIDEO" alarm display from screen.

Table 1-17 XX 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.
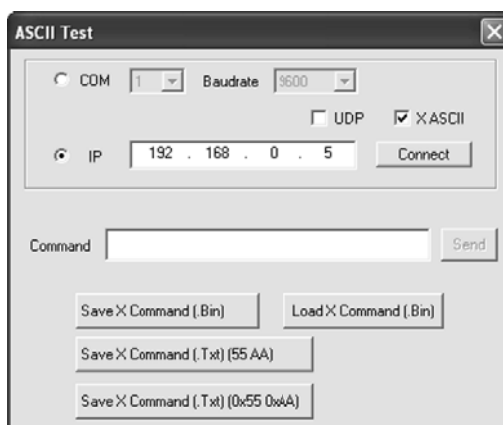

Figure A-1 ASCII Test Utility: Click "X ASCII" Checkbox

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

*Step 4.   Click **Connect**.*

*Step 5.   Type **XL 000000000 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 000000000.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 000000000 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.
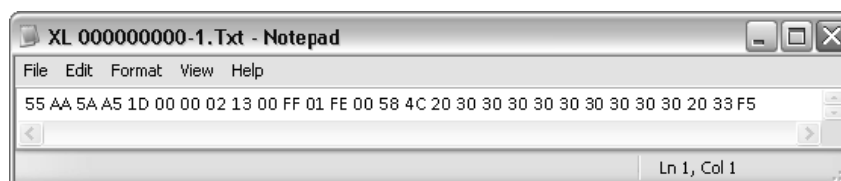

XL 000000000-1.Txt - Notepad

File   Edit   Format   View   Help

55 AA 5A A5 1D 00 00 02 13 00 FF 01 FE 00 58 4C 20 30 30 30 30 30 30 30 30 30 20 33 F5

Ln 1, Col 1

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

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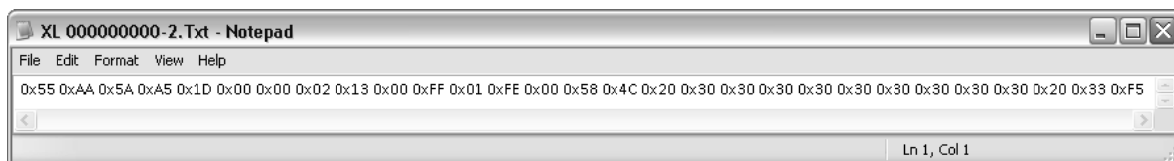

XL 000000000-2.Txt - Notepad

File Edit Format View Help

0x55 0xAA 0x5A 0xA5 0x1D 0x00 0x00 0x02 0x13 0x00 0xFF 0x01 0xFE 0x00 0x58 0x4C 0x20 0x30 0x30 0x30 0x30 0x30 0x30 0x30 0x30 0x30 0x20 0x33 0xF5

Ln 1, Col 1

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: 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 Plus' 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 FE 00 58 4E 20 30 30 31 30 30 33 30 30 31 20 45 20 31 61

The last byte "0x5F" in the above binary stream is the Checksum byte.

Appendix C   Using the ASCII XG and XW Commands

C.1 Sample Illustration on Using the XG Command

To display the right bottom quarter of the input image of Card ID:4 Window ID:2 using the XG command –

Step 1. Double-click the "ASCII_Test.exe" file.

Step 2. Click the "X ASCII" checkbox.

*Step 3. Enter the correct **IP** address assigned to your Titan 9000 chassis.*

*Step 4. Click **Connect**.*

*Step 5. To display the right bottom quarter of the input image of Card ID:4 Window ID:2,
type **XG 004004002 960 540 960 540**
(format: **XG GGGMMMPPP X** position **Y** position **W**(idth) **H**(eight) relative to the individual
window's resolution)
in the **Command** window.*

*where:
crop **X** = 1920 / 2 = 960
crop **Y** = 1080 / 2 = 540
crop **W**idth = 1920 / 2 = 960
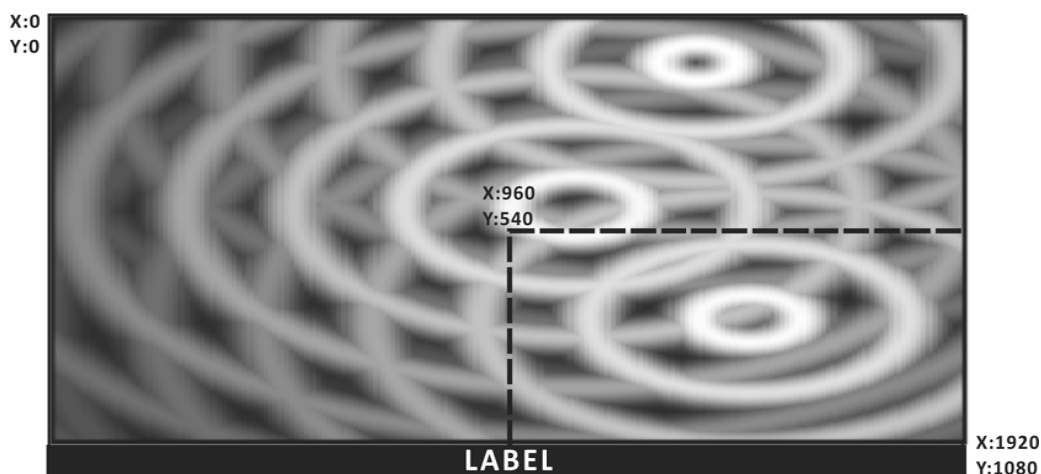crop **H**eight = 1080 / 2 = 540*

Figure C-1 Crop Right Bottom Quarter of the Image

*Step 6. Click **Send**.*

Cropped image will "automatically fill-up image window" when using the ASCII XG command.

C.2 Sample Illustration on Using the XW Command

Using the abovementioned illustration as an example, to display the image in its actual size after cropping and positioned in the middle of the window using the XW command –

Step 1. *Type **XW 004004002 600 878 240 135***
*(format: **XW GGGMMMPPP X** position **Y** position **W**(idth) **H**(eight) relative to the whole output monitor's resolution)*
*in the **Command** window.*

where:

*position **X** = 480 (width of Card ID:4 Window ID:1) +*
120 (width of Card ID:4 Window ID:2 / 2 / 2)=
600

*position **Y** = 270 (height of Card ID:1 Window ID:2) +*
270 (height of Card ID:2 Window ID:2) +
270 (height of Card ID:3 Window ID:2) +
67.5 (height of Card ID:4 Window ID:2 / 2 / 2=
878 (877.5 rounded to the nearest numerical value in increments of "2")

*image **W**idth = 1920 (width of entire output monitor's resolution) / 4 / 2 = 240*

*image **H**eight = 1080 (height of entire output monitor's resolution) / 4 / 2 = 135*
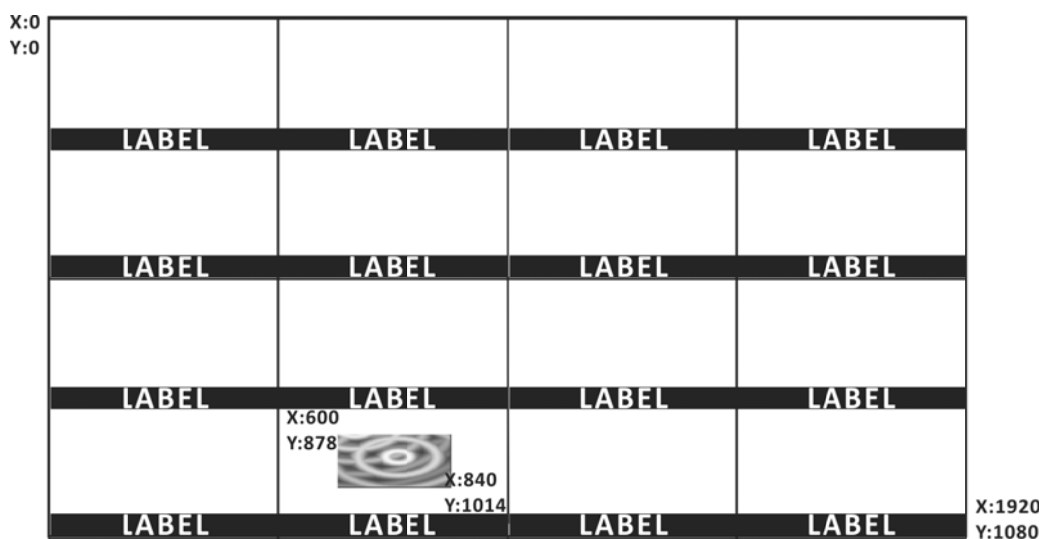
Step 2. *Click **Send**.*

Figure C-2 Display Image in its Actual Size After Cropping and Position in Middle of Window