PROCEED®

AVP
RS-232 Control
Quick Guide

MADRIGAL

Table of Contents

Overview

The following information will guide the installer through simple set up and programming for RS-232 control of a Proceed AVP.

Please read through the entire document before attempting to control an AVP via RS-232.

Should you have any questions about RS-232 control of an AVP please contact Madrigal Audio Labs Technical Support.

Contacting Technical Support

Phone	860-346-0896	9am to 5pm EST Monday thru Friday
Fax	860-347-6251	Please allow 24hrs for reply
Email	madts@harman.com	Please allow 24hrs for reply

Before Beginning

Before you begin the setup of the AVP for RS-232 control make sure the following items are at hand.

- AVP with the correct software version. *See Software Revision Section below*
- Control Device being used to control the AVP.
- Owners Manual for the control device being used.
- AVP Owners Manual to familiarize yourself with the AVPs functions.
- Cable to connect the AVP to the Control Device. *See RS-232 Control Cable below*
- Layout of the functions you intend to use on the AVP.
- Knowledge of this document and the Control Device being used.

Software Revision

The information contained in this document is intended to control AVPs with the latest revision of software and hardware. This section describes the necessary hardware and software needed to control an AVP via RS-232.

Before programming and installing the AVP, please verify that the AVP contains the following.

Identifying Downloadable Software

Software in the AVP must be v3.13. The following describes how to identify software in an AVP.

Release Date: 5/16/01 ***Starting s/n:*** 4885

The **ABOUT** screen in the AVP on-screen menu lists the software version IDs. The first 6 digits in each ID represent the software development date.

About Screen ID
AVP ID :**05090116**
DSP ID :**0374:6**

Identifying Hardware

A change was made to the way an AVP is controlled via RS-232. To ensure that the AVP will function correctly the following parts must be installed in the AVP.

Part # **770445** New UI front panel chip

Part # **770451** New Software flashchip

The parts listed above store the downloadable software, IR and RS-232 control of the AVP. Any AVP that contains software higher then v3.13 has these parts. The above parts can NOT be used with software below v3.13.

Retrieving Software

The software can be found on the Madrigal Software Website. Please refer to Technical Service Document # **MLPR81099** for information on accessing the site.

Files to Download AVPOS330.DLF AVPDS330.DLF

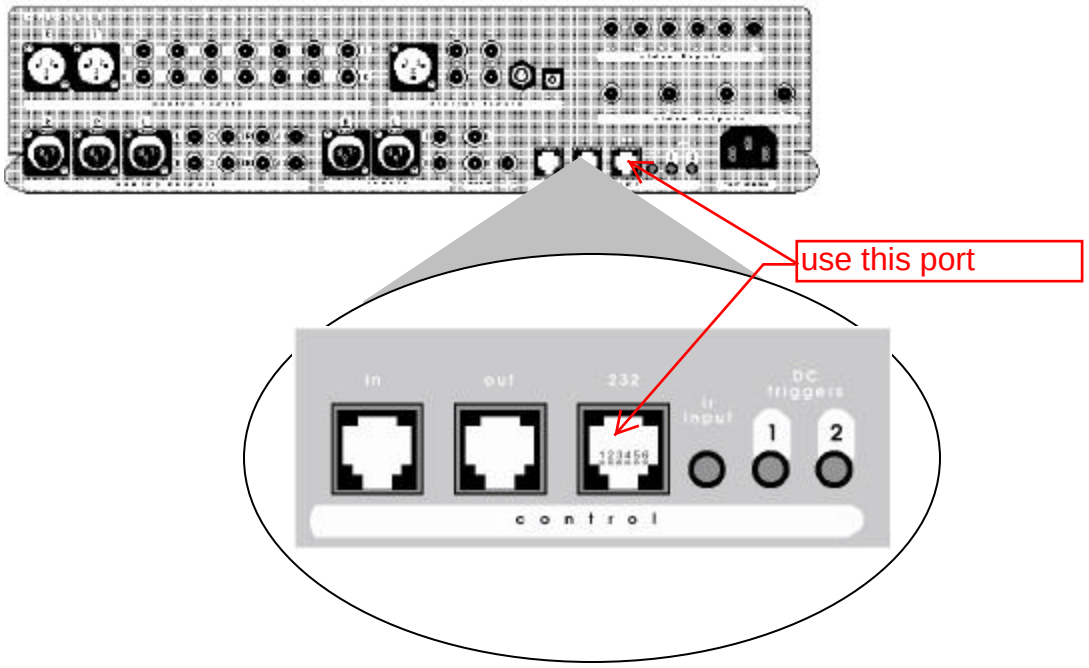
Connection

RS-232 Port Location

RS-232 control is through an RJ-11 connector located on the back of the AVP next to the IR output. This connector has 6 pins of which only three are used for communication.

Diagram 1 – RS-232 Port Location

Back Panel of AVP



RS-232 Port Pin Configuration.

The AVP will receive control data on pin 2 Data Receive and transmit status data on pin 3 Data Transmit. The connection Cable between the AVP and the control device will need to be configured so that the AVPs receive is connected to the control devices transmit. Please refer to the product owner's manual for the control device you are using for RS-232 port type and configuration.

Pin 2	Rx from the PC	Data Receive
Pin 3	Tx to the PC	Data Transmit
Pin 5	Digital system ground	

RS-232 Control Cable

Madrigal Audio Labs offers several parts to help communicate via RS-232 to the AVP. The following parts can be order from Madrigal Audio Labs Technical Support.

Part #	Description
MRC878	DSUB9 to RJ-11 Adaptor and 2 meter RJ-11 to RJ-11 Cable
MRC808	DSUB9 to RJ-11 Adaptor
MLC732	2 meter RJ-11 to RJ-11 Cable
(Length of Cable RJ-11 to RJ-11)	RJ-11 to RJ-11 cable required length

For general purpose and short cable runs to the AVP, Part # MRC878 contains everything needed.

For cable lengths of more then 2 meters - Part # MRC808 and the length of cable needed should be ordered.

RS-232 control units with port types other then DSUB9 will need to have the cable constructed. To construct a cable please follow the example below.

Control Cable Example

As an example on making the cable we will use the most common connector used, which is a DSUB9. The AVP only needs 3 pins to control the unit via RS-232. As mentioned earlier the AVPs pin 2 Data Receive must connect to the control devices Transmit. Please read the notes below before constructing the RS-232 cable.

Before Constructing the Communication Cable

- ❑ Verify Control Devices RS-232 Port Type and Configuration – Refer to Control Device Owners Manual
- ❑ Determine length of cable needed – Check the control device owners manual for length limitations
- ❑ Have all available parts
  - o Length of Cable needed
  - o RJ-11 Connector
  - o RJ-11 Crimp tool
  - o Connector type used by RS-232 device

Cable Layout

The following diagram shows how to construct a basic DSUB9 to RJ-11 Cable.

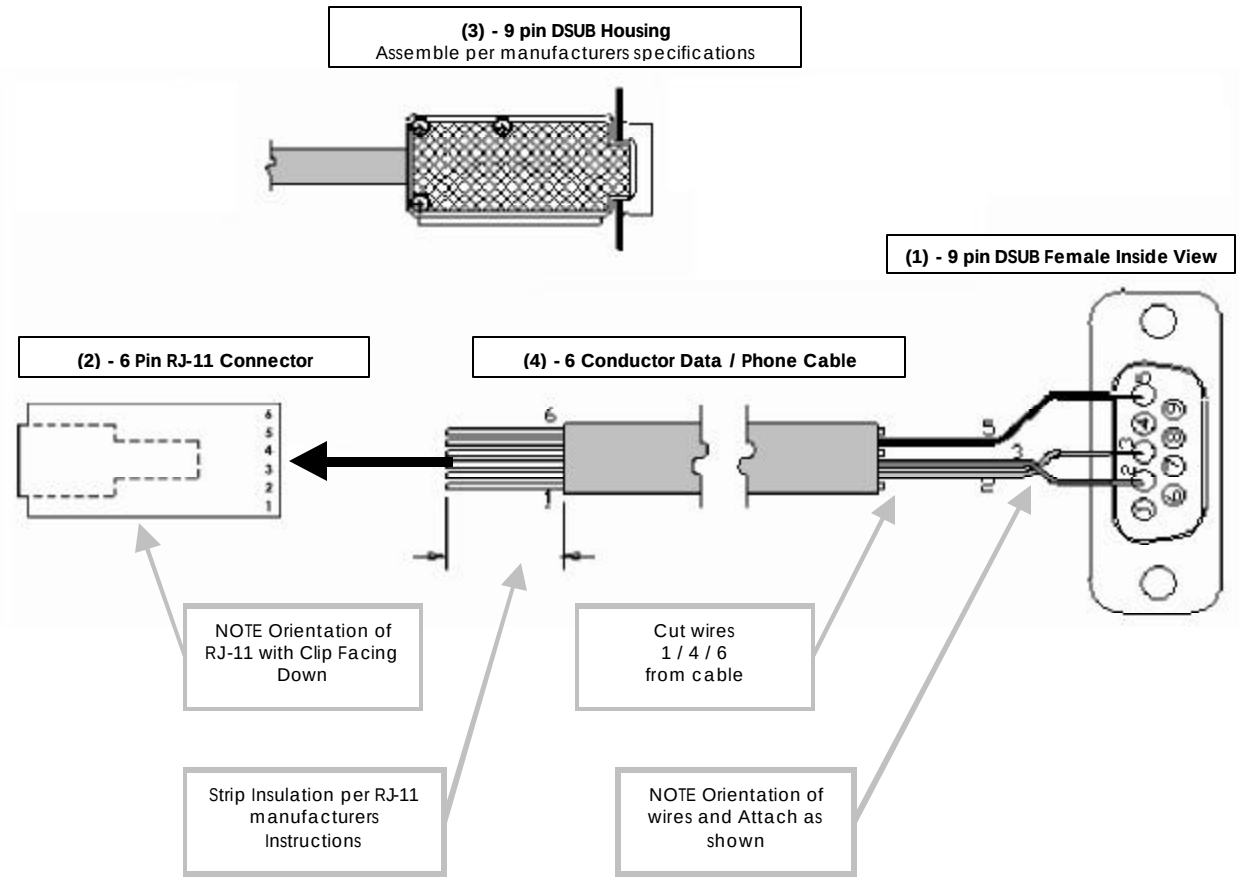
Cable Connections

AVP RJ-11 Pins		Controller DSUB9 Pins
1 – NOT USED	NO CONNECTION	
2 – Data Receive	———Connect to———	**3 – Data Transmit**
3 – Data Transmit	———Connect to———	**2 – Data Receive**
4 – NOT USED	NO CONNECTION	
5 – Digital Ground	———Connect to———	**5 – Digital Ground**
6 – NOT USED	NO CONNECTION	

Diagram 2 – RJ-11 to DSUB9 Cable

Parts Used for Cable

	Digikey Part#	Radioshack Part #
(1) - 9 pin DSUB Female Connector	A2047-ND	276-1537
(2) - 6 pin RJ-11 Connector	A9027-ND	279-421
(3) - 9 pin DSUB Housing	A9001-ND	276-1539
(4) - 6 Conductor Data / Phone Cable	H0063 (length in feet)-ND	910-2319



AVP Configuration

The AVP will receive RS-232 commands without any setup required. However if you chose the AVP can be set up to ignore the Checksum (CRC) at the end of the command string. By setting the AVP to ignore the CRC, it will not send out an acknowledgement to the control system.

NOTE: The command list contained in this document shows the complete string for the command with the correct CRC included. These strings listed in this document should be in whole used even if the CRC is turned off.

Setting the AVP to ignore CRC

1. Press and HOLD the recall button on the front of the AVP until the MENU appears on the monitor and the AVP Display reads OSD ACTIVE
2. Before pressing and other buttons Press and Release the SUB button on the AVP followed by the MASTER button. These buttons must be pressed within 2 seconds of each other
3. A Technical Menu will appear on the monitor. Using the VOLUME control scroll down to CRC.
4. Press the MUTE button on the front of the AVP to select CRC. Use the volume control to change the setting to OFF.
5. Press MUTE on the front panel to save the change.
6. Press and Release recall until MENUs are exited.

RS-232 Format

The control device must be set to the following settings to communicate with the AVP.

Baud rate	9600
Start bit	One
Data bits	Eight
Stop bit.	One
Parity	None

Command Strings

The AVP command strings are hexadecimal format. When programming the strings please follow the guidelines of the control system being used for hexadecimal data.

Hexadecimal data is a series of numbers and letters that make up a byte. All command strings listed here are shown with spaces between the bytes of data but the spaces are not part of the command needed. Each control system will specify a separator to be used between bytes or a method to identify the byte as hex. Please refer to the control system manual for proper sting byte separation and hex identification.

Examples

Crestron requires a **\x** in front of each section of the command to see the value as HEX. Without the **\x** the AVP will not respond to the command.

AVP OPERATE \x02\x02\x29\xBE\xC0

Action	***Action Description***	***Complete String***
Zone selection		
BOTH Path Direct	Input select acts on both MAIN and REMOTE zones	02 02 28 7E 01
MAIN Path Direct	Input select acts on MAIN ZONE	02 02 26 BA 80
PATH	Toggles between MAIN / REMOTE / BOTH paths on the AVP	02 02 0F 64 41
REMOTE Path Direct	Input select acts on REMOTE ZONE	02 02 27 7A 41
Video Sources		
Disc1	Disc 1 Source Selection	02 02 04 A3 00
Next Video source	NEXT VIDEO Source Selection (Remote Command)	02 02 5A 5B 81
Previous Video Source	Previous Video Selection (Remote Command)	02 02 4B 57 41
Satellite	SAT Source Selection	02 02 01 A0 C0
TV / aux	TV / AUX Source Selection	02 02 0D A5 C0
Vcr1	VCR1 Source Selection	02 02 0C 65 01
Vcr2 / disc2	VCR2 / Disc 2 Source Selection	02 02 14 6F 01
Audio Sources		
Aux	AUX Source Selection	02 02 15 AF C0
CD	CD Source Selection	02 02 02 A1 80
MORE	Toggles through the assigned MORE inputs.	02 02 06 62 81
MORE input AUX1	MORE input AUX1 Source Selection	02 02 5B 9B 40
MORE input AUX2	MORE input AUX2 Source Selection	02 02 5C 59 01
MORE input AUX3	MORE input AUX3 Source Selection	02 02 5D 99 C0
MORE input AUX4	MORE input AUX4 Source Selection	02 02 5E 98 80

Action	*Action Description*	*Complete String*
MORE input AUX5	MORE input AUX5 Source Selection	02 02 5F 58 41
MORE input AUX6	MORE input AUX6 Source Selection	02 02 60 48 01
MORE input AUX7	MORE input AUX7 Source Selection	02 02 61 88 C0
MORE input AUX8	MORE input AUX8 Source Selection	02 02 62 89 80
Next Aduio Source	NEXT Audio Source Selection (Remote Command)	02 02 96 0E 81
Previous Audio Source	Previous Audio Selection (Remote Command)	02 02 87 02 41
Tape	TAPE Source Selection	02 02 05 63 C1
Tuner	Tuner Source Selection	02 02 0E A4 80
Volume Controls		
BALANCE	Sets Key up/dn to change system balance	02 02 10 AC 00
CENTER	Sets Key up/dn to change center speaker output level	02 02 19 AA C0
Direct Volume 1	Sets AVP output to Favorite volume setting 1	02 02 36 76 81
Direct Volume 2	Sets AVP output to Favorite volume setting 2	02 02 37 B6 40
Direct Volume 3	Sets AVP output to Favorite volume setting 3	02 02 38 B2 00
Direct Volume 4	Sets AVP output to Favorite volume setting 4	02 02 39 72 C1
Direct Volume 5	Sets AVP output to Favorite volume setting 5	02 02 3A 13 80
LEVEL	Sets Key up/dn to change analog source (ADC) input level .	02 02 0A 67 81
MASTER	Sets Key up/dn to control the master volume of the main zone	02 02 08 A6 00
MUTE	Mutes the volume of the AVP	02 02 1A AB 80
REAR	Sets Key up/dn to change the REAR speakers output level	02 02 09 66 C1
Remote Volume Key DOWN	Volume down	02 03 C3 A1 40
Remote Volume Key UP	Volume up	02 03 D2 AD 80
Control Commands		
Dual Drive Toggle	Sets Dual Drive on or off	02 02 63 49 41
Late Night Off Direct	Removes LATE Night compression mode	02 02 2E 7C 81
Late Night ON Direct	Applies LATE compression mode	02 02 2D 7D C1
Mute OFF Direct	Removes MUTE	02 02 2C BD 00
Mute ON Direct	Applies MUTE	02 02 2B 7F 41
Operate Direct	Sets AVP from Standby to Operate (ON)	02 02 29 BE C0
Projector OFF	Turns Madrigal projector OFF through Proceed Link	02 02 43 91 40

Action	*Action Description*	*Complete String*
Projector ON	Turns Madrigal projector ON through Proceed Link	02 02 42 51 81
Standby Direct	Sets AVP from Operate to Standby (OFF)	02 02 2A BF 80
SUB Toggle	Toggle sub woofer output on or off	02 02 4C 95 00
Trigger 1 OFF	Set trigger out 1 to OFF	02 02 33 75 41
Trigger 1 ON	Set trigger out 1 to ON	02 02 32 B5 80
Trigger 2 OFF	Set trigger out 2 to OFF	02 02 35 77 C1
Trigger 2 ON	Set trigger out 2 to ON	02 02 34 B7 00
Surround Modes		
Discrete Late Night Compression Toggle	Toggles LATE NIGHT compression mode in or out	02 02 50 5C 01
DTS Film Direct	Apply DTS FILM surround mode	02 02 64 8B 00
DTS Music Direct	Apply DTS MUSIC surround mode	02 02 66 4A 81
DTS THX Direct	Apply DTS THX surround mode	02 02 65 4B C1
MODE	Toggles trough available surround modes	02 02 16 AE 80
MONO Direct	Apply MONO sound mode	02 02 25 BB C0
MONO Surround Direct	Apply MONO signal to all outputs	02 02 23 B9 40
Pro Logic Direct	Apply Pro-Logic surround mode	02 02 21 78 C1
Pro Logic THX Direct	Apply Pro-Logic with THX surround mode	02 02 20 B8 00
Stereo Surround Direct	Apply Surround mode to Stereo	02 02 22 79 81
SURROUND OFF Direct	Apply 2 CH SURROUND OFF (Stereo) Mode	02 02 24 7B 01
THX OFF Direct	Remove THX from surround mode	02 02 31 B4 C0
THX ON Direct	Apply THX to surround mode	02 02 30 74 01
THX Toggle	Toggle THX mode on or off	02 02 51 9C C0
Front Panel Display		
DELAY	Sets the delay time from front to rear channels	02 02 12 6D 81
Display Intensity	Toggles through front panel display intensity	02 02 07 A2 40
MENU	Enter or leave MENU display	02 02 3C 71 01
RECALL	Resets system settings back to AVPs setup after a change is made to channel outputs or delay timing	02 02 17 6E 41
Special	Special button on Remote	02 02 69 4E C1
Standby Toggle	Toggles between STANDBY and OPERATE	02 02 18 6A 01

Action	*Action Description*	*Complete String*
Status	Displays Status for AVP to On Screen Display	02 02 4F 94 40
SUB	Sets Volume control to change SUB output level	02 02 11 6C C1
Remote Commands		
ENTER for MENU	Enter for Seleceted MENU Command	02 02 78 42 01
Status to PC (see below)		
Status to PC	Returns status of AVP to RS-232 controller (See STATUS TO PC Section for Details)	02 02 76 86 80

Status Response

By sending the Status to PC Command (76) the AVP will return information on the unit's current state. This information can be used by the control system to activate other devices or device functions. The following section describes each packets content.

Status Response Structure

The Status Request Command (76) will return a string of 30 Packets in HEXADECIMAL format. Below is a list of all available packets.

Packet [0]	Length of command
Packet [1]	Status key code returned
Packet [2]	Main zone audio input number
Packet [4]	Main zone video input number
Packet [5]	Main zone volume index
Packet [6]	Remote zone audio input number
Packet [7]	Remote zone video input number
Packet [8]	Remote zone volume index;
Packet [9]	Current application;
Packet [10]	Status bits
Packet [11]	Surround mode
Packet [12]	Front panel LED image byte 1;
Packet [13]	Front panel LED image byte 2;
Packet [14]	Front panel LED image byte 3;
Packet [15]	Front panel LED image byte 4;
Packet [16.27]	Front panel ASCII display;
Packet [28.29]	CRC bytes

Packet 0

Length of command sent - This packet is always is 1C and gives a starting point for the following packets

Packet 1

Status Key Returned - This packet is the acknowledge of the Status to PC command and will always be 76

Packet 2

Main Zone Audio Source Number – Packet 2 shows the current source selected in the main zone. The following table shows the hex value returned and the source button it represents. The AVPs More inputs are represented but do not have an associated front panel source button. A list of the more inputs programming should be kept for reference.

Hex Returned	Input #	Front Panel Button Label
01	1	VCR1
02	2	DISC1
03	3	VCR2/DISC2
04	4	TV/AUX
05	5	SAT
06	6	CD
07	7	TAPE
08	8	AUX
09	9	TUNER
0A	MORE 1	NONE
0B	MORE 2	NONE
0C	MORE 3	NONE
0D	MORE 4	NONE
0E	MORE 5	NONE
0F	MORE 6	NONE
10	MORE 7	NONE
11	MORE 8	NONE

Packet 3

Not Defined – Packet 3 is not defined and thus has no information on system status. This packet will always return a 08h.

NOTE: The hex value of this packet is the hex value for a backspace. Due to this certain programs will need to set up to ignore a backspace or the previous packet will be eliminated from the response. Please refer to the manual for your RS-232 control system on how to turn off the backspace if needed.

Packet 4

Main Zone Video Input Number – Packet 4 shows the current video source of the AVP. Sources that have a video input defined in setup will follow the table described in packet 2 above. Sources with no video input defined will show a value of 82hfor packet 4 indicating that the current source from packet 2 is audio only.

Packet 5

Main Zone Volume – Packet 5 shows the absolute volume of the AVP main zone. The table in Appendix A shows the hex value returned and the appropriate volume.

NOTE 1: The AVPs volume control does not track all numbers between 0 and max volume. This includes no half-volume steps until 31.5. The table in appendix A shows all volume settings of the AVP from 0 to 92 (factory setting for max volume).

NOTE 2: The AVP maybe setup to show the volume in a 0 db RELATIVE scale. The relative volume setting requires looking at other information in the AVP that is not available to the status request. To see what the relative volume is the front panel ASCII information as described in Packets 16 to 27 will need to be used.

Packet 6

Remote Zone Audio Input – Packet 6 shows the current audio source for the remote zone and follows the source table in packet 2. Please see packet 2 above.

Packet 7

Remote Zone Video Input – Packet 7 shows the current video source for the remote zone and follows the same return as in packet 4. Please see packet 4 above.

Packet 8

Remote Zone Volume – Packet 8 shows the absolute volume of the AVP remote zone just as packet 5 shows the main zone volume setting. Please see packet 5 above.

Packet 9

Current Application – The value of this packet shows the current type of digital application. Analog signals will be 00h.

Hex Value	Application Type
00	PCM
01	AC-3
03	DTS
05	MPEG
06	96k PCM
FF	None (No Signal)

Packet 10

Status Bits – The value of packet 10 shows the current status of certain AVP parameters. The parameters include standby state and THX mode as well as others. Certain values in this packet have no meaning and are not listed. Any value not listed should be ignored.

NOTE: The hex values will be added together should 2 or more parameters be meet. Example: THX ON (40) and SUB ON (80). These values would be displayed as C0h.

Hex Value	Status
01	2-channel signal. This also includes AC-3 2.0.0
02	Standby
08	AVP is displaying the setup menu. Packets 16 to 17 will indicate an ASCII display of OSD ACTIVE
10	10db DTS boost. This value will only appear on older DTS discs as DTS has now added the 10db boost to all DTS encoded material
40	THX ON
80	SUB ON

Packet 11

Surround Mode – Packet 11 shows the current surround mode of the AVP. The following table lists the hex values and associated surround mode.

Hex Value	Surround Mode
00	Discrete AC-3 or DTS
01	Pro Logic
02	Pro Logic with THX
03	Stereo Surround
04	Mono Surround
05	2 Channel Surround OFF
06	Mono

Packet 12 to 15

Front Panel Led Image – The values of these packets are for AVP internal use and have no real world correlation. The values of the packets should be ignored.

Packet 16 to 27

Front Panel ASCII Display – Packets 16 to 27 are the actual characters displayed on the AVPs front panel display. These values will show the name of the source and the volume setting of the AVP. The volume setting can be used to back up the information from packet 5 or packet 8. These values can also be used to determine the relative volume setting should it be required.

NOTE: The path of the AVP must be changed to REMOTE in order to see the remote zone values. The following steps allow reading of the remote zone display.

Packet / Character Layout

1. Switch the AVPs path to remote
2. Request the status by sending the status to pc command
3. Look at the ASCII values of the display returned in packet 16 to 27.

The packets start from the left side of the display with packet 16 and end on the right with packet 27. See Appendix B for the hex to ASCII code list.

Packet	16	17	18	19	20	21	22	23	24	25	26	27
Character	1	2	3	4	5	6	7	8	9	10	11	12

Packets 28 to 30

CRC Bytes – Packets 28 to 30 show the CRC bytes of the communication and do not have any correlation to AVP status.

Appendix A – Volume Table

Hex	Volume	Hex	Volume	Hex	Volume	Hex	Volume
00	0.0	26	37.0	4C	56.0	72	75.0
01	1.0	27	37.5	4D	56.5	73	75.5
02	3.0	28	38.0	4E	57.0	74	76.0
03	5.0	29	38.5	4F	57.5	75	76.5
04	7.0	2A	39.0	50	58.0	76	77.0
05	9.0	2B	39.5	51	58.5	77	77.5
06	11.0	2C	40.0	52	59.0	78	78.0
07	12.0	2D	40.5	53	59.5	79	78.5
08	13.0	2E	41.0	54	60.0	7A	79.0
09	14.0	2F	41.5	55	60.5	7B	79.5
0A	15.0	30	42.0	56	61.0	7C	80.0
0B	16.0	31	42.5	57	61.5	7D	80.5
0C	17.0	32	43.0	58	62.0	7E	81.0
0D	18.0	33	43.5	59	62.5	7F	81.5
0E	19.0	34	44.0	5A	63.0	80	82.0
0F	20.0	35	44.5	5B	63.5	81	82.5
10	21.0	36	45.0	5C	64.0	82	83.0
11	22.0	37	45.5	5D	64.5	83	83.5
12	23.0	38	46.0	5E	65.0	84	84.0
13	24.0	39	46.5	5F	65.5	85	84.5
14	25.0	3A	47.0	60	66.0	86	85.0
15	26.0	3B	47.5	61	66.5	87	85.5
16	27.0	3C	48.0	62	67.0	88	86.0
17	28.0	3D	48.5	63	67.5	89	86.5
18	29.0	3E	49.0	64	68.0	8A	87.0
19	30.0	3F	49.5	65	68.5	8B	87.5
1A	31.0	40	50.0	66	69.0	8C	88.0
1B	31.5	41	50.5	67	69.5	8D	88.5
1C	32.0	42	51.0	68	70.0	8E	89.0
1D	32.5	43	51.5	69	70.5	8F	89.5
1E	33.0	44	52.0	6A	71.0	90	90.0
1F	33.5	45	52.5	6B	71.5	91	90.5
20	34.0	46	53.0	6C	72.0	92	91.0
21	34.5	47	53.5	6D	72.5	93	91.5
22	35.0	48	54.0	6E	73.0	94	92.0
23	35.5	49	54.5	6F	73.5		
24	36.0	4A	55.0	70	74.0		
25	36.5	4B	55.5	71	74.5		

Appendix B – ASCII Codes

Hex	ASCII
20	space
26	&
27	/
2A	*
2B	+
2C	,
2D	-
2E	.
30	0
31	1
32	2
33	3
34	4
35	5
36	6
37	7
38	8
39	9
3A	:
3D	=
3F	?
41	A
42	B
43	C

Hex	ASCII
44	D
45	E
46	F
47	G
48	H
49	I
4A	J
4B	K
4C	L
4D	M
4E	N
4F	O
50	P
51	Q
52	R
53	S
54	T
55	U
56	V
57	W
58	X
59	Y
5A	Z

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