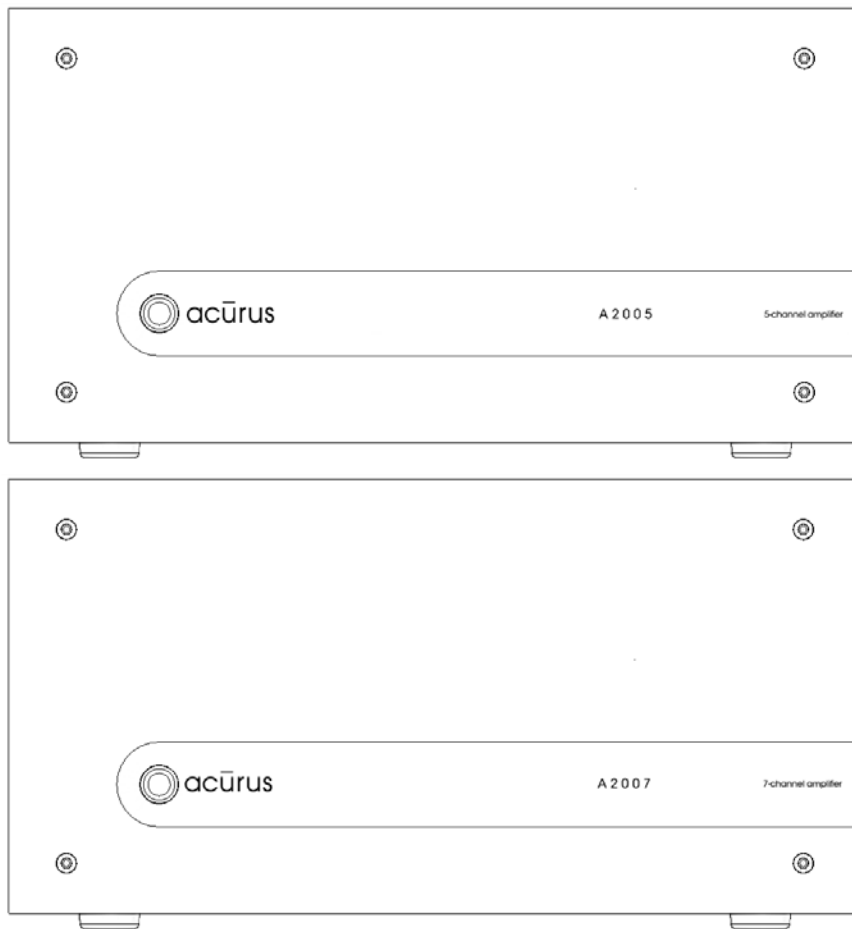


# acūrus

## A2005/7 System Control Protocol



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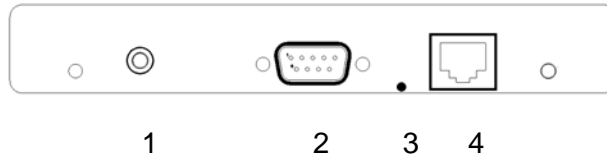
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# A2005/A2007 System Control Protocol

## Introduction

The A2005/A2007 Audio amplifier contains four different control systems that can be used for basic control, custom installations, end user or installer diagnostics, and IP based control systems. The amplifier contains a +12V trigger Input, RS-232 control port, an Ethernet control port, and a built in web server. These four control systems are outlined in detail in this document. The illustration below has been provided to identify each connection on the back of the amplifier.



### 1 - External 12V Trigger Input

Within the network module section, a 3.5mm jack allows for connection to a typical 5-24V trigger output from an external pre-amp or pre-amp/processor via a stereo 3.5mm cable.

### 2 – RS-232 Serial Control Port (DB-9)

The network module section contains an RS-232 DB-9 connector for interface to an external system controller. Contact Indy Audio Labs for a list of verified control system manufacturers.

### 3 - Ethernet Network Active LED

The Ethernet Network Active LED illuminates green with an active network connection between the Acurus amplifier and a network switch or router.

### 4 – Ethernet Jack Connection (Web Control or UDP Control)

The Ethernet jack enables connection to either an external system controller or to a standard home Ethernet 10/100 network switch or router port. Control and status monitoring of the amplifier using any device with a web browser is supported via the web server embedded in the Acurus amplifier.

This document is designed to be used in conjunction with the A2000 Series Product User Manual and will be referenced multiple times throughout this document. The manual can be downloaded at the Acurus website, [www.acurusav.com](http://www.acurusav.com)

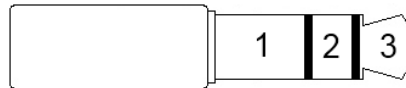
<http://www.acurusav.com/manual/a2005usermanual.pdf>

<http://www.acurusav.com/manual/a2007usermanual.pdf>

## +12V Trigger Control/Specifications

A control system or preamplifier system can control Power ON / OFF state via the trigger input (3.5mm) jack labeled 12VDC trigger on the amplifier. The jack is wired with its tip active and will accept a stereo or mono plug. The amplifier will recognize +5V to +24VDC input signals as well as the traditional +12V input. The pin out is shown below:

### 3.5mm stereo plug



**1 – Ground**

**2 – Ground**

**3 – Trigger Voltage**

**NOTE:** The front panel power button functions normally even if the trigger input is used. The Acurus amplifier will automatically resume control sync with the external preamp after the next time system power is cycled.

## RS-232 Control Specifications

The A2005/A2007 Audio Amplifier uses a standard RS-232 (DB-9) connection. A Null Modem Cable must be used to connect to the RS-232 connector located on the back of the amplifier. The RS-232 Control system is functional right out of the box.

For Serial Control via the RS-232 port, the **SERIAL** must be selected on the web interface, set via the Ethernet port. The default setting is: **SERIAL** control interface. The Web Interface can enable or disable the RS-232 control port. *Please refer the A2000 Series Amplifier User Guide for more details about how to select the Ethernet and Serial Control via the Web interface.*



The RS-232 (DB-9) pin out is defined in the table below:

### DB-9 Serial Pin Out

PIN	TYPE
2	TX DATA (Transmit)
3	RX DATA (Receive)
5	GND (Ground)

### Serial Communication Format

FORMAT	SETTING
Baud Rate	9600
Data Bits	8
Stop Bit	1
Parity	NO
Flow Control	NO

The A2005/A2007 Audio Amplifier is designed to receive serial commands and execute upon receiving the command. This simple format allows for very efficient communication between the amplifier and the control system.

The command table is shown below:

COMMAND TYPE	VALUE (HEX)	VALUE (DECIMAL)	ASCII SYMBOL
LED BRIGHTNESS = LOW	31	49	1
LED BRIGHTNESS = MED	32	50	2
LED BRIGHTNESS = HIGH	33	51	3
CH1 MUTE TOGGLE	51	81	Q
CH2 MUTE TOGGLE	52	82	R
CH3 MUTE TOGGLE	53	83	S
CH4 MUTE TOGGLE	54	84	T
CH5 MUTE TOGGLE	55	85	U
*CH6 MUTE TOGGLE	56	86	V
*CH7 MUTE TOGGLE	57	87	W
POWER TOGGLE	61	97	a
MUTE ALL CH. TOGGLE	62	98	b

\*Only CH6 and CH7 can only be used on the A2007 (7 Channel Audio Amplifier)

The response to each command is proprietary hex code used for Acurus Control system and should be ignored by the external control system.

**SEND CMD FORMAT:** XX (XX is the Value in Hex, Decimal, or ASCII Symbol per table)

*EXAMPLE*

**SEND CMD:** 49 (49 – The Front Panel Brightness would be set to the low setting.)

The status check table is shown below:

STATUS TYPE	VALUE (HEX)	VALUE (DECIMAL)	ASCII SYMBOL	RETURN
POWER STATE	70	112	p	ON or OFF

**SEND STATUS CMD FORMAT:** XX (XX is the Value in Hex, Decimal, or ASCII Symbol per table)

*EXAMPLE*

**SEND CMD:** 70 (70 – The Power Status command.)

**RESPONSE:** ON (Return either “ON” or “OFF”.)

## Web Based Control Specifications

The A2005/A2007 Audio Amplifiers contain a built in web server. Direct control and status monitoring tools are located on the web page for the product. This feature is a great tool for diagnostic / setup of the product. This interface will also auto optimize the user interface for mobile devices. All that is required is a device with a web browser, a standard router, and an A2000 series amplifier. All controls for the product are available on the amplifier Web Page.

To use the web interface: *Visit the website for the amplifier.*

http:// IP ADDRESS     **Example:** http://192.168.1.240

*Please refer the A2000 Series Amplifier User Guide for more details about how to discover and use the advanced Web interface, via the Ethernet connection.*

## Ethernet Based Control Specifications

This amplifier is also designed to receive external control commands via the Ethernet port. All commands use UDP Protocol (User Datagram Protocol) format for transmission over a standard IP network. A unique status table is also available via XML format on the on the device. The Ethernet port on the amplifier should be connected to the router. The external control system should also be connected to the same router via wired or wireless connection.

## UDP Format / Initial Settings

All UDP control devices will require the IP Address of the Amplifier and the UDP Control Port. The IP Address can be different depending on the setup of the installation.

IP ADDRESS	DHCP or STATIC
UDP PORT	26482

Default Ethernet Control settings are listed in the table below:

DEFAULT SETTINGS	
A2005 IP ADDRESS	192.168.1.241
A2007 IP ADDRESS	192.168.1.240
DHCP	ON
UDP PORT STATE	OFF (CLOSED)

## UDP Control Setup

The following steps have been outlined to simply configuring the amplifier for UDP control from an external source. You have to know the IP Address, UDP Port number, and Enable the UDP Port on the amplifier to control the device via UDP. Once these three steps are complete, you can issue the UDP commands via an external control system.

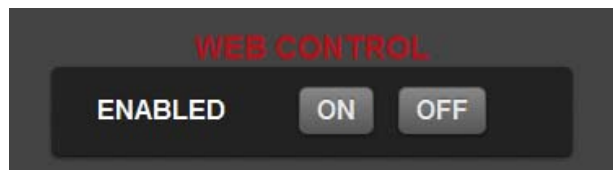
*Please refer the A2000 Series Amplifier User Guide for more details about how to discover and setup DHCP or set a static IP address.*

1. **Identify the IP Address of the amplifier** (Recommended: Set a Static IP when setting up an external control system or disable DHCP on the network. Doing this will prevent the network router from changing the IP address )
2. **Identify the UDP Port of the amplifier.** The UDP port is: **26482**
3. **Enable UDP Port on the amplifier.** This can only be done via the web interface on the amplifier through a web browser. The address would be:

[http:// IP ADDRESS/settings.html](http://IP_ADDRESS/settings.html)

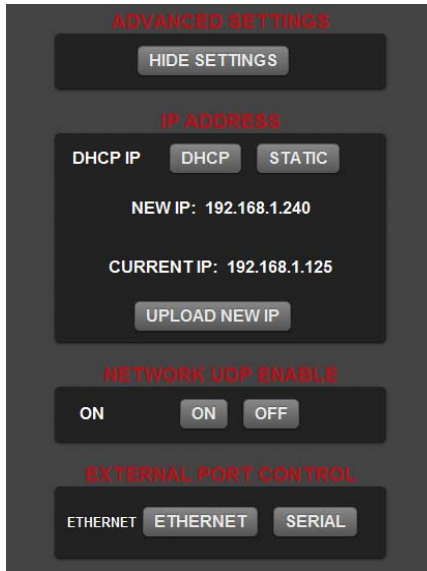
**Example:** <http://192.168.1.240/settings.html>

Browse down to the Web Control and Select "ON". Ensure that Web Control is "ON" or "ENABLED".





Next, browse down to the Advanced Settings button and Select “SHOW SETTINGS”. Ensure that NETWORK UDP ENABLE is “ON” and that the EXTERNAL PORT CONTROL is set to “ETHERNET”. All settings are stored in memory and will be retained even if the amplifier loses power.



## UDP Command Table

The table below outlines the command structure available for UDP control. *Note the MUTE commands will only execute when the amplifier is powered in the “ON” state.*

COMMAND TYPE	CMD (HEX)
POWER ON	01 FE 11 FF 00 00 00
POWER OFF	01 FE 11 FF 01 00 00
MUTE ALL CHANNELS ON	01 FE 12 FF 01 00 00
MUTE ALL CHANNELS OFF	01 FE 12 FF 00 00 00
LED BRIGHTNESS = LOW	01 FE 19 FF 31 00 00
LED BRIGHTNESS = MED	01 FE 19 FF 32 00 00
LED BRIGHTNESS = HIGH	01 FE 19 FF 33 00 00
CH1 MUTE TOGGLE	01 FE 19 FF 51 00 00
CH2 MUTE TOGGLE	01 FE 19 FF 52 00 00
CH3 MUTE TOGGLE	01 FE 19 FF 53 00 00
CH4 MUTE TOGGLE	01 FE 19 FF 54 00 00
CH5 MUTE TOGGLE	01 FE 19 FF 55 00 00
*CH6 MUTE TOGGLE	01 FE 19 FF 56 00 00
*CH7 MUTE TOGGLE	01 FE 19 FF 57 00 00

\*Only CH6 and CH7 can only be used on the A2007 (7 Channel Audio Amplifier)

The UDP data to be sent consists of 7 HEX codes that will be transmitted to the designated IP address and Port. The format is shown below.

**SEND CMD FORMAT:** X1 X2 X3 X4 X5 X6 X7 (X# is the Value in HEX)

*EXAMPLE*

**SEND CMD:** 01 FE 11 FF 00 00 00 (The unit would be powered ON)

For testing purposes, feel free to use a UDP Test program to verify operation of the amplifier once set up. An example of a free tool available online that is useful is the **UDP Test Tool** from Simple Com Tools.

**Available at:** <http://www.simplecomtools.com/ProductCart/pc/viewPrd.asp?idproduct=6&idcategory=5>

### XML Status Monitoring

Real time status monitoring can be done by an external control system via the *status.xml* file available on the amplifier. Many modern external control systems have means of reading and parsing xml files. The XML file can be found at this address on the amplifier:

[http:// IP ADDRESS/status.xml](http://IP ADDRESS/status.xml)

**Example:** <http://192.168.1.240/status.xml>

The XML format is contains three levels of information: 1) Identifies this product as an amplifier, 2) Identifies the Model of Product, and 3) Provides low level status information about individual parameters key to the system. An example of the format is shown here:

```
<AMP>
  <A2007>
    <TYPE>SYSTEM</TYPE>
    <TITLE>System Power Stat:</TITLE>
    <DATA>0</DATA>
  </A2007>
  <A2007>
    <TYPE>SYSTEM</TYPE>
    <TITLE>System Mute Stat:</TITLE>
    <DATA>0</DATA>
  </A2007>
  <A2007>
    <TYPE>CH1</TYPE>
    <TITLE>CH 1 Temp:</TITLE>
    <DATA>37</DATA>
  </A2007>
</AMP>
```

The status information contains three reference parameters, Type, Title, and Data. The Type and Title identify the parameter and the Data parameter contains the current state data information. The following table below identifies all parameters and there possible states.

TYPE	TITLE	DATA	DATA STATE
SYSTEM	System Power Stat	1 or 0	0 = SYSTEM OFF 1 = SYSTEM ON
SYSTEM	System Mute Stat	1 or 0	0 = MUTE ALL OFF 1 = MUTE ALL ON
CH 1	Ch 1 Temp.	0 - 255	RESERVED FOR ACURUS CONTROL SYSTEMS
CH 2	Ch 2 Temp.	0 - 255	RESERVED FOR ACURUS CONTROL SYSTEMS
CH 3	Ch 3 Temp.	0 - 255	RESERVED FOR ACURUS CONTROL SYSTEMS
CH 4	Ch 4 Temp.	0 - 255	RESERVED FOR ACURUS CONTROL SYSTEMS
CH 5	Ch 5 Temp.	0 - 255	RESERVED FOR ACURUS CONTROL SYSTEMS
CH 6	Ch 6 Temp.	0 - 255	RESERVED FOR ACURUS CONTROL SYSTEMS
CH 7	Ch 7 Temp.	0 - 255	RESERVED FOR ACURUS CONTROL SYSTEMS
TEMP	Temp Units	67 or 70	67 = DEGREES C 70 = DEGREES F
SYSTEM	Network Trigger RX Status	1 or 0	0 = UDP PORT CLOSED 1 = UDP PORT OPEN
SYSTEM	Mac Address	00 - 03 - 75 - XX - XX - XX	CONTAINS THE MAC ADDRESS OF THE AMP.
UDP	UDP IP ADDRESS	255.255.255.255	RESERVED FOR ACURUS CONTROL SYSTEMS
UDP	UDP MAC ADDRESS	FF - FF - FF - FF - FF - FF	RESERVED FOR ACURUS CONTROL SYSTEMS

A sample XML file taken from an A2007 that was powered on is shown below.

```

<AMP>
  <A2007>
    <TYPE>SYSTEM</TYPE>
    <TITLE>System Power Stat:</TITLE>
    <DATA>1</DATA>
  </A2007>
  <A2007>
    <TYPE>SYSTEM</TYPE>
    <TITLE>System Mute Stat:</TITLE>
    <DATA>0</DATA>
  </A2007>
  <A2007>
    <TYPE>CH1</TYPE>
    <TITLE>CH 1 Temp:</TITLE>
    <DATA>37</DATA>
  </A2007>
  <A2007>
    <TYPE>CH2</TYPE>
    <TITLE>CH 2 Temp:</TITLE>
    <DATA>37</DATA>
  </A2007>
  <A2007>
    <TYPE>CH3</TYPE>
    <TITLE>CH 3 Temp:</TITLE>
    <DATA>37</DATA>
  </A2007>
  <A2007>
    <TYPE>CH4</TYPE>
    <TITLE>CH 4 Temp:</TITLE>
    <DATA>37</DATA>
  </A2007>
  <A2007>
    <TYPE>CH5</TYPE>
    <TITLE>CH 5 Temp:</TITLE>
    <DATA>37</DATA>
  </A2007>
  <A2007>

```

```
<TYPE>CH6</TYPE>
<TITLE>CH 6 Temp:</TITLE>
<DATA>37</DATA>
</A2007>
<A2007>
  <TYPE>CH7</TYPE>
  <TITLE>CH 7 Temp:</TITLE>
  <DATA>37</DATA>
</A2007>
<A2007>
  <TYPE>TEMP</TYPE>
  <TITLE>TEMP Units:</TITLE>
  <DATA>67</DATA>
</A2007>
<A2007>
  <TYPE>SYSTEM</TYPE>
  <TITLE>Network Trigger RX Status:</TITLE>
  <DATA>1</DATA>
</A2007>
<A2007>
  <TYPE>SYSTEM</TYPE>
  <TITLE>MAC Address:</TITLE>
  <DATA>00 - 03 - 75 - 0F - B5 - 14</DATA>
</A2007>
<A2007>
  <TYPE>UDP</TYPE>
  <TITLE>UDP IP Address:</TITLE>
  <DATA>255.255.255.255</DATA>
</A2007>
<A2007>
  <TYPE>UDP</TYPE>
  <TITLE>UDP MAC Address:</TITLE>
  <DATA>FF - FF - FF - FF - FF - FF</DATA>
</A2007>
</AMP>
```