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iRidium for AV & Custom Systems (TCP) allows you to control any equipment with Ethernetinterfaces or Wi-Fi modules. The control is performed via TCP/IP, locally or via the Internet.

Conditions for working with the driver:

- possibility to control the selected equipment via TCP/IP
- commands for controlling equipment via TCP/IP and the protocol
- possibility to create scripts if the protocol suggests authorization and requires data exchange with control panels

Description of driver work:

The "AV & Custom Systems (TCP)" driver opens and supports connection session with equipment via TCP/IP. Then the connection is established, you can send commands to the connected equipment – the list of commands is formed by the user in the process of creating a project. Feedback from the equipment is received by processing data by the script crated in the iRidium project iRidium (see iRidium DDK and iRidium Script API).

A These instructions describe creation of scripts for processing data received from equipment. Receipt of feedback from equipment is described in the <u>iRidium DDK</u> section.

Work Principles of AV & Custom Systems (TCP)

In iRidium you can use the universal "AV & Custom Systems" (TCP) driver to connect to your Audio-Video and other equipment. The scheme of communication between iRidium and controlled equipment:



Protocol for data sending: TCP/IP.

Supported formats of data exchange: ASCII, HEX, DEC. Use <u>iRidium syntax</u> for writing commands in different formats.

Feedback from equipment: there is none in the standard variant. It is implemented with the help of iRidium Script, see <u>iRidium DDK</u>.

Required licenses: Device License Pro for AV & Custom Systems (see. <u>Licensing</u>). It works with any equipment controlled with the help of "AV & Custom Systems". It enables use of any scripts in your projects.

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Creation and Setting up of the AV & Custom Systems (TCP) Driver

Select the AV & Custom Systems tab in the DEVICE BASE window of <u>iRidium GUI Editor</u>. Open it and find "AV & Custom Systems (TCP)". Drag the driver into the PROJECT DEVICE PANEL window:

PROJECT DEVICE PAN	EL	tevice base	
+ - - □ ■	ano 👱 ;	Reserve (2.0))evice
 Froject Tokens Project Tokens → Drivers → Driver Toke Commands → AV (Feedback ↓ AV (m Systems (TCP) ns Control Command Control Feedback	AV & Custom Systems AV & Custom Systems (HTTP) AV & Custom Systems (RS232) AV & Custom Systems (RS232) AV & Custom Systems (TCP) AV Control Command AV Control Feedback AV Control Feedback AV & Custom Systems (UDP) Beckhoff ADS	🛍 Project 🛍 GC Cloud
PROPERTIES			
Name Driver Type Background Mode Local Connection Host Port Mode Script Mode	AV & Custom Systems (. Custom Driver (TCP) False 192.168.0.100 123 Always Connected Direct & Script	□ DuoTecno □ □ □	

Properties of connection to equipment using AV & Custom Systems (TCP):

- Host the IP-address of the controlled equipment (local, external or the domain name)
- $\ensuremath{\textbf{Port}}$ the TCP port for connection to equipment
- Login the login for authorization via TCP/IP
- **Password** the password for authorization via TCP/IP
- \boldsymbol{Mode} the mode of supporting the connection session
 - Always Connected the connection session is supported all the time iRidium is running
 - Connect when Sending the session opens only for command sending. It does not allow to monitor feedback.
- Script Mode the mode of command sending and communication with scripts in iRidium projects
 - $_{\odot}$ Direct & Script data from the command will be sent directly to the equipment and processes by the script system
 - Script Only commands created inside the driver are not sent directly to the equipment but are processed by the script system first.

To connect to equipment via the Internet:

- 1. Indicate the public address of your Internet router in the Host field
- 3. Set up <u>Port Forwarding</u> on your router to enable remote control of your equipment .

You can learn the public IP-address of your router with the help of external resources, for example [1]

To switch between local and Internet connection:

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Structure of the AV & Custom Systems Driver

The AV & Custom Systems in iRidium projects consists of 3 parts:

- Driver Tokens the list of variables which store information about connection to equipment
- **Commands** the list of commands which can be sent to equipment (or script) by pressing interface buttons
- **Feedbacks** the list of feedback channels where data from the controlled equipment (processed by the iRidium script system) can be written.

Properties and applications of the driver parts:

Driver Tokens

Driver Tokens - variables storing the status of connection to the controlled equipment. These properties can be read only.

To use a token, drag it on the graphic item (the token value can be output in the item text field or it can be used to change the item state).



- **Status** the status of connection to the system (Offline/Connecting/Online/Waiting = 0...3)
- Host the domain name of the remote system
- **HostPort** the port of the remote system to which $\underline{iRidium App}$ is connected
- IP the IP-address of the control panel
- HostIP an IP-address of the remote system to which iRidium is connected
- **Port** the local port of the client through which the connection to the remote device is established

Commands and Feedbacks

<u>Commands</u> – the list of commands which can be sent to the equipment (or scripts) by pressing interface buttons. It is filled at random. The number of commands is not limited.

Feedbacks – the list of feedback channels where data from the controlled equipment (processed by the iRidium script system) can be written. The data written in the Data filed of the Feedback channel can be read using the script.



Commands

- Name the command name, at random
- **Data** the data the command has to send at the activation. They can be written in HEX, DEC, ASCII
- **Desable Header** it is used only for Global Cache modules and ready script drivers. Leave "False" by default.

Feedback

- Name the feedback channel name. You can refer to the channel from scripts for writing data.
- **Data** the data which the feedback channel stores at the project launch. They can be rewritten with the help of graphic item commands or scripts.

To assign a command to a graphic item:

drag it on the graphic item and select the event on which it should be sent:

- **Press** pressing on the item
- **Release** releasing the item
- Hold holding the item
- Move moving on the item (it is mostly used for Level)

To assign a feedback channel to a graphic item:

drag it on the graphic item and select what it should affect:

- **In Value** when receiving any non-zero value the item will change its state (State 1/State 2). It is used for visualizing changes by changing the item appearance.
- In Text when receiving any data they will be written in the item text field
- **More...** the received data can affect any other item properties (see the available properties in the dialog window)

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Sending Commands to AV Equipment

Select the commands you need to add in the list of the AV & Custom Systems (TCP) driver. They can be stored in one of the following formats:

- ASCII string
- HEX hexadecimal
- DEC decimal

You need to prepare the information which is stored in one of these formats correctly so iRidium could process it and send to the equipment. Use iRidium "syntax" for forming commands of the AV & Custom Systems driver. The syntax is similar for TCP, UDP, RS232.

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Commands in the ASCII Format (Strings)

Add a ASCII string in the "Data" window:

- include it in 'single quotes'.
- if the string is followed by data in a different format, separate them with commas
- use "carriage return" <CR> and "line end" <LF> symbols

Initial command (in documentation):	PWR01	VOLUME 50	AUD 1>3	6CH/8CH <cr> <lf></lf></cr>
In iRidium (the Data field):	'PWR01'	'VOLUME 50'	'AUD 1>3'	'6CH/8CH', <mark>0x0D</mark> , 0x0A

The "carriage return" <CR> and "line end" <LF> symbols:

In documentation:	<cr></cr>	<cr></cr>	<cr></cr>	<lf></lf>	<lf></lf>	<lf></lf>
In iRidium (the Data field):	0x0D	\$0D	13	0x0A	\$0A	10

You can use any of the 3 variants for indicating the line end.

To send a command using <u>iRidium Script</u>:

```
function SendCommand()
{
    IR.GetDevice("AV & Custom Systems (TCP)").Send(['PWR01', 0x0D]);
    IR.GetDevice("AV & Custom Systems (TCP)").Send(['VOLUME 50', '\r\n']);
    IR.GetDevice("AV & Custom Systems (TCP)").Send(['AUD 1>3', 13]);
}
```

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Commands in the HEX (Hexadecimal) Format

Add HEX data in the "Data" window:

- write **\$** or **0x** before each HEX symbol
- do not use blank spaces, divide HEX symbols with commas
- if there are additional symbols near HEX symbols in your documentation, remove them (FFh > FF)
- use "carriage return" <CR> and "line end" <LF> symbols after the last HEX symbol

Initial command (in documentation):	01 81 81 81	19h EEh A1h C1h	16 8A FF FF <cr></cr> <lf></lf>
In iRidium (the Data field):	0x01,0x81,0x81,0x81	0x19,0xEE,0xA1,0xC1	0x16,0x8A,0xFF,0xFF, 0x0D,0x0A

The "carriage return" <CR> and "line end" <LF> symbols:

In documentation:	<cr></cr>	<cr></cr>	<cr></cr>	<lf></lf>	<lf></lf>	<lf></lf>
In iRidium (the Data field):	0x0D	\$0D	13	0x0A	\$0A	10

To send a command using <u>iRidium Script</u>:

```
function SendCommand()
{
    IR.GetDevice("AV & Custom Systems (TCP)").Send([0x01, 0x81, 0x81, 0x81,
0x0D]);
    IR.GetDevice("AV & Custom Systems (TCP)").Send([0x16, 0x8A ,0xFF, 13,
10]);
}
```

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Commands in the DEC (Decimal) Format

Add DEC data in the "Data" window:

- do not use additional symbols
- do not use blank spaces, divide symbols with commas
- use "carriage return" <CR> and "line end" <LF> symbols after the last number

Initial command (in documentation):	01 255 255 05 25	20 30 40 50 <cr></cr> <lf></lf>
In iRidium (the Data field):	01,255,255,05,25	20,30,40,50, <mark>13</mark> ,10

The "carriage return" <CR> and "line end" <LF> symbols:

In documentation:	<cr></cr>	<cr></cr>	<cr></cr>	<lf></lf>	<lf></lf>	<lf></lf>
In iRidium (the Data field):	0x0D	\$0D	13	0x0A	\$0A	10

To send a command using *iRidium Script*:

```
function SendCommand()
{
    IR.GetDevice("AV & Custom Systems (TCP)").Send([01, 255, 255, 13]);
    IR.GetDevice("AV & Custom Systems (TCP)").Send([20, 30, 40, 50, 0x0D,
0x0A]);
}
```

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Working with AV & Custom Systems (TCP) Commands

Example of using commands for AV & Custom Systems (TCP):

ь	PROJECTS OVERVIEW	•	350 4	0 450	500 550 6	00 ⁶⁵⁰ ⁷ 0	·	PROJECT DEVI	CE PANEL			·. #
Pages	B 🗆 🖿 🔍 🕮 🖉	9 0 0		•		Ģ		🔹 - 🔁 📽	+ +		• <u>•</u>	Device
Overview 🚺	Project 1 B Page 1 Page 1 BAOS-wiki-1024.irj		50	•	Power O	n•		System System Project Trivers Drivers Av 4	Tokens Tokens & Custom Syste	ems (TCP) 🚺		🖆 Project
Galle	OBJECT PROPERTIES			<u> </u>		N		E Con	er i okens mands			B
ş	General Progra	mming States	150						-> (1) Comma	ind 1		ŝ
	Name	Item 1		Send Comma	and			-	Command :	2		2
	Left	460	200						Command :			ā
	Тор	37		Action:	Send Command			4 Fee	dback			
	Width	189		-Event for A	ction							
	Height	102										
	Active	True		Press								
	Visible	True 🦰			🕑			PROPERTIES				
	Specific				xc 💛			Mama		Command 1		\sim
	Туре	Button		Hold				Data		DOWED ON 0-00		2
	Feedback	Momentary	-					Disable Header		Folice		<u> </u>
	Hit	Active Touch		- Move				Usable reader		raise		-
	Password Number	None	350									
	Default Value		-	Ok		Cancel						
	Hold Time	500	1			- Control						
	Repeat Time	250	400					1				

1. Add the AV & Custom Systems (TCP) driver in your iRidium project. Set up properties of connection to the equipment.

2. Create a command. Indicate data for sending to equipment in the Data field.

3. Set up the button which will be responsible for sending the command.

Feedback: Momentary

- **4.** Drag the command on the button.
- 5. Select the event the on which the command will be sent:

Press – pressing on the item Release – releasing the item Hold – holding the item Move – moving on the item (it is mainly used for Level)

A You cannot change the command in the Data field when the project is already uploaded on your control panel. It means that if your command, for example, is responsible for setting the volume to 50%, it cannot be assigned to Level for gradual volume regulation. It will work only with Button and set the volume to 50% at each pressing.

A To send values (e.g. volume) cfrom Level, you need to from the command with the help of scripts (see <u>iRidium Script API</u> and <u>iRidium DDK</u>), not in the project tree.

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Creation of Your Own Base of AV & Custom Systems (TCP) Commands

To use AV & Custom Systems (TCP) in any iRidium project you need to save it in the iRidium data base.

Use **DB Editor** for adding devices. New devices can be added only to custom data bases as standard data bases cannot be edited.

A Creation of data bases is not the only way of transferring commands from one iRidium project to another. If you created a device with commands in your iRidium project, you can import it to another project using File > Import > *.irpz

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Creating Data Bases

Use custom data bases for storing your devices. They are created in DB Editor. When creating a data base, indicate its name and directory for saving.

DEV	ICE BASE		iRid	ium Driver Data	Base E	ditor	
≣≡	GC.db 🔹	Dev	GC.	db 🝷	8*	8* 87	
 	曾 GC-100-06 曾 GC-100-12		-	New Database	_		
 	曾 GC-IRL 曾 ITach IP2CC	🛛 Proje		F Database Loaca	tion:	iles\iRidium ı	nobile2\Editor\database\ <mark>userdatabase.db</mark>
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.	曾 ITach WF2IR			曾 iTach IP2SL			
÷	曾 ITach WF2SL			會 iTach WF2IR			

Use your own data bases (created manually) for storing your devices not standard data bases which can be updated with releases of new versions of iRidium GUI Editor. The names of the base file and folder for storing are indicated when creating the file.

Creating new TCP devices:

The type of the created device - TCP (TCP Device) - defines its transport part and characteristics.



Setting up TCP devices

Describe new devices to help with their further identification:

iRidium Driver DataBase Editor				□ × □
userdatabase.db 🔻 昌本 昌* 昌*	General	Outputs	Com	mands & Feedback
📮 ÷ ≞ ⊡ × 🗷	Name Kramer]
🛱 Kramer	Device Type		•	
	Manufacturer		•	
	Owner Customer			
	Version 0			
	Date 29/10/2012	-		
	Script:		• ×	
	Input			
	Туре ТСР			•
	÷ ⊗ ×			
	Nº Name	Default	Hidden Descrip	tion
	1 Host	Enter IP adress here.	No	
	2 Port	Enter port here.	No	
	3 Parameters		No	
	4 Login			
		!		
				Close

- Device Type the type of the controlled device (TV, DVD, Blu Ray, ...)
- Manufacturer the name of the device manufacturer
- Description description of the device, it can include hyper links
- Date the date of creating the driver

Properties for connection:

- Host the IP-address of the device in your network
- Port the port the device uses

Optional properties:

- Parameters additional properties for connection
- Login
- Password

The optional properties can be hidden: click two times on the property to open the window for settings and select **Hidden**.

			□ ×
General	Outputs		Commands & Feedback
Name Kramer			
Device Type Manufacturer			• •
Owner Cus Description Krar Default: Version 0 Description Date 29/1	Login V		
Script:			×
Type TCF		Cl	
		Cancel	
Nº Name	Default	Hidden	Description
1 Host	Enter IP adress here.	No	
2 Port	Enter port here.	No	
3 Parameters		No	
4 Login		No	
5 Password		No	
			Close

Adding commands in the list of devices

Go to the Commands & Feedback tab and use tools of iRidium GUI Editor:

				□ ×
General		Outputs	Comman	nds & Feedback
Add Command	Add	Feedback 📎 🗙 🗟	2 S Learn	
	mmand		×	
	Reset			
			Lancel	

The command is empty by default. The instruction the command should send is indicated in the **Command Properties** window. Click two times on the created command to open the **Command Properties** window.

iRidium Driver DataBase Editor 🛛 🗖 🗙						
uвerdatabase.db 🝷 昌◆	8* 87	General		Outputs	Commands & Feedb	ack
👳 ÷ 監 ा × ∭		 Add Command → Virtual → Reset 	+ Add Feedback	⊗ × ₩ ♥	Learn	
	Command Name Read Description Reset Devic Command '# RESET',1 Use Sqeuar	Properties Reset Only e			Cancel	
					Clos	e

- Write the instruction for the command in the **Command** field of the opened window. In our case for the **Reset** command (device resetting) there is the '**# RESET',13** instruction, where**# RESET** is the instruction content, **13** = <CR> (the command is sent in the ASCII format).
- Mark the **Name Read Only** field if you do not want to change the command name in the future (it is used when the driver works with scripts which refer to the command identifying it by its name).
- In the **Descriptions** field indicate the command description.

When all commands are added, you can close the **DB Editor** window.

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Switching Between the Local and Internet Connection

If the control panel should hold the connection with the system when the panel is out of the limits of the Wi-Fi network of the system, you need to set up the switch between the Internet and the local network.

The remote mode suggests connection to the system via the Internet. At that the external IP-address or the domain name of the system to which you need to connect have to be used.

A To control the system remotely you have to open the system for external access - to set up <u>the Port Forwarding Service</u>.

A To secure equipment from unauthorized access we recommend using secure connection with the remote system (VPN).

Setting up of the switch Wi-Fi/3G in iRidium projects:



1. Open the script editor in iRidium GUI Editor.

2. Download and add into your project the template of the Wi-Fi/3G switch (Add Script from file): **download the template of the Wi-Fi/3G switch**

The Wi-Fi/3G switch is performed with the help of the script function SetParameters

Setting up of parameters of the Wi-Fi/3G switch:

function Internal_1() // Function name

{

IR.GetDevice('AV & Custom Systems (TCP)').SetParameters({Host: "192.168.0.100", Port: "5005"}); // Driver Name + Parameters

}

```
function External 1()
```

{

IR.GetDevice('AV & Custom Systems (TCP)').SetParameters({Host: "220.115.10.10", Port: "5005",});

}

Indicate in the command settings:

- Function name the name of the switch function (command). Two functions cannot have the same name in a project.
- Driver Name the name of the driver which parameters are changed
- Parameters the set of the switch parameters which you need to apply to the driver

Assign commands to buttons:

- 1. Select the button which will be responsible for the Wi-Fi/3G switch.
- Open the properties of the button: Object Properties > Programming
- 2. Open $\underline{Macros \ Editor}$ of the button for the Press or Release events
- 3. Select the ${\bf Script} \ {\bf Call} \ {\bf command} \ {\bf and} \ {\bf add} \ {\bf it} \ {\bf by} \ {\bf double-clicking} \ {\bf on} \ {\bf it}$
- 4. Select the name of the function you want to activate in the drop-down list. Create the command.

Marced_	reconnect_	· 190			B Dinteg
OBJECT PROPERTIES			Wi-Fi / 3G reconnection	Macros Editor On Release Event	- × -
General	Programming	States 200		Macros	Commands
(0) Relations (0) Press (1) Release (1) Scyle Cal (0) Hold (0) Hove	Internal_1	states	Choose connection mode: Wi-Fi (Local) 3G (Inet)	x + + 19 x = 10.5 sript Call (Internal_1) 02. Sorpt Call () JS Function x value: Internal_1 0K Cancel	Send Token Societary Other Ot
		450			

Set up access to the equipment from the Internet:

In order to do that open the equipment ports for remote access.

Download the example of the Wi-Fi/3G switch (project) >>

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Downloads

Download: Example of a project for controlling the Kramer commutator via TCP (1 Mb) Example of switching Wi-Fi/Internet for AV & Custom Systems

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