AZKOYEN
MEDIOS DE PAGO

Modular AC DSP

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1 INTRODUCTION.

This manual describes the operating mode of the AC-DSP range, coin validators that are part of the so-called Modular DSP series. The points covered in this document are therefore valid for the following models of validators:

- AC6-D2S
- AC6-D4S
- A6-D2S **
- A6-D4S **

** The previous range of validators called **A-DSP** is included in the range of validators **AC-DSP**. For more detailed information on this point, consult paragraph 1.2 of the manual "Technical Information"

In this manual the general term AC-DSP will refer to any of the above validators.

For full information on the technical characteristics and operation of these validators, this manual must be complemented with the corresponding product manual "Technical Information" available on the Azkoyen website "http://sat.azkoyen.com".

The AC- DSP validator can operate in three different modes:

- ✓ Parallel
- ✓ Timer
- ✓ Credit.

Each one will be explained in detail in section 3 - Operation.

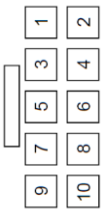
The selection of one or another operating mode is done using dip switches.

2 CONNECTION AND PINOUT.

The validators AC-DSP have 2 connectors that are accessible to the user.

Figure 1. Connectors accessible to the user.

2.1 Connector J1 (10 pins) for communication with the machine.



It is the main connector for communication with the machine. Power to the validator is through pins 1 (GND) and 2 (Vdc) for this connector

The function of each of the pins will vary depending on the operating mode selected by the user. See section 3 Operation for details.

2.2 Connector J2 (4 pins) for the communication with the Azkoyen tools.

This 4-pin connector is used to connect the validator software tools (**HEUS**) and the Azkoyen hardware interface (**TL20**).

Section 5 Tools, gives details on the procedure to follow for the connection of the validator tools.

This connector pinout is detailed in the following table:

Connector J2. AZKOYEN TOOLS.		
Pins	**Function**	**Notes**
Pin 1	Rx	Reception of data
Pin 2	GND	
Pin 3	Tx	Transmission of Data
Pin 4	Vin	

Table 1. Pinout connector of tools

Power of 12/24 V is not supplied through this connector so it is always necessary to keep the validator powered through the J1 connector for communication between the Validator and the Azkoyen tools.

3 OPERATION

3.1 Selecting the operating mode.

To select the desired operating mode, use the dip switches on the circuit board that is accessible after removing the rear cover of validator. Possible modes of operation can be configured following the instructions in the following table:

SW1	SW2	SW3	SW4	OPERATING MODE
0	0	0	0	Parallel
1	0	0	0	Timer
0	1	0	0	Credits

Table 2. Configuration of the protocol using dip switches.

3.2 Validator AC-DSP in Parallel mode

The operation of the validator in parallel mode is characterized by giving a pulse (signal), on one or several pins on the connector, when you enter a valid coin.

The coin value assigned to each pin (or output) will depend on the particular configuration of each validator and will be a modifiable setting using Azkoyen tools.

These validators have 7 output lines (see the table), which can be:

- **Dedicated:** They use a line for each coin, which means that you will only be able to use 6 different coins.
- **Binary:** They use multiple output lines to identify a coin which means that the maximum number of currencies to be used will be 32.

Connector J1 on the Output module		
Pins	**Function**	**Notes**
Pin 1	GND	
Pin 2	12-24 Vdc	Minimum: + 10 Vdc; Maximum: +27 Vdc
Pin 3	Output 5	Open collector, transistor NPN.
Pin 4	Output 6	Open collector, transistor NPN
Pin 5	Output 7	Open collector, transistor NPN.
Pin 6	Inhibition	Input
Pin 7	Output 1	Open collector, transistor NPN
Pin 8	Output 2	Open collector, transistor NPN
Pin 9	Output 3	Open collector, transistor NPN
Pin 10	Output 4	Open collector, transistor NPN

Table 3. Pinout in parallel mode

Input pin 6 works as inhibition in the acceptance of coins (the range of inhibition is configurable). It works in a general way, i.e. it jointly enables or inhibits all coins programmed.

In this type of operation, you work directly, without any communication with the machine, i.e. when the validator validates a coin, it consults the inhibition input values and depending on its value, it accepts (or rejects) the coin and gives a pulse for a duration determined by the assigned output/s.

There are a series of parameters in this operating mode whose default values are configurable and modifiable with the Azkoyen tools:

- The **duration of the output pulses**.
- The **signal edge of the inhibition signal**.
- The **assigning of outputs**.

3.3 Validator AC-DSP in Timer mode.

The operation of the validator in timer mode is characterized by giving an operating time (power/access) when the programmed price for that time period is reached by introducing the necessary coins

The pinout of the connector J1 in this operating mode is as follows:

Connector J1 of Output module		
Pins	**Function**	**Notes**
Pin 1	GND	
Pin 2	12-24 Vdc	Minimum: + 10 Vdc; Maximum: +27 Vdc
Pin 6	Input	Inhibition coins/request service
Pins 3, 4, 5,7,8,9 and 10	Output	Available for output of Operating time, Counter, Warning signal, Credit available

Table 4. Pinout Timer mode

These validators can work in three different modes

- **Working in continuous mode.**

  When it reaches (or exceeds) the programmed price, the validator automatically and continuously gives the time corresponding to the entered price. The value of the output pin status remains unchanged until the end of the service

  If the introduced amount was higher than the price, but insufficient to achieve the value of another service, the remaining value will be stored.

  The output pin is configurable

  Input pin 6 works as inhibition in the acceptance of coins. The flank of inhibition is configurable.

Example:

Price: **€1** Signal for this price: **60** seconds

The user enters **€2**

The validator immediately gives a signal of 120 seconds on the corresponding pin

- **Working in continuous mode with start request.**

When it reaches (or exceeds) the programmed price, the user needs to request the service through pin 6. Once this happens, the time will be provided continuously.

For the start request to be valid, it is necessary for pin 6 to produce a change of status "inactive" state (which can be "0" or "1" as it is configured) to the "active" state for a minimum of 50 milliseconds. This pin has to go back to the inactive state during a minimum time of 50 milliseconds to make the sale of the next signal.

If the introduced amount was higher than the price, but insufficient to achieve the value of another service, the remaining value will be stored.

Figure 2. Signal Times

Example:

Price: **€1** Signal for this price: **60 seconds**

User introduces **€2**

Until the user requests the service on pin 6, the validator will not send service. Once the user requests the service, the validator will give a signal of 120 seconds to the corresponding pin.

- **Working in Service Request Mode.**

When the programmed price is reached (or exceeded) the user needs to request the service on pin 6 to obtain a service. Once this happens, one service time will be provided.

If the remaining amount is sufficient to provide another service, a new request application is required to start it.

The request signals are sent to pin 6 one by one. For this to happen pin 6 must produces a change of status "inactive" state (which can be "0" or "1" as is configured) to the "active" state for a minimum of 50 milliseconds. We need this pin to go back to the standby state for a minimum time of 50 milliseconds to make the sale of the next service.

Figure 3. Signal Times

If the introduced amount was higher than the amount required, but insufficient to reach the value of the price programmed, the remaining value will be stored.

Example:

Price: **€1** Signal for this price: **60 seconds**

The user introduces **€2**

Until the user requests the service on 6 pin, the validator will not work. Once the user requests the service, the validator will give a signal of 60 seconds to the corresponding pin. A new service request is required to obtain the 60 remaining seconds.

In the three working modes described above, you may obtain several signals which provide information on the Status of the validator:

- **Counter** signal. It is used to count the base coin values that are introduced into the machine. It is variable and configurable, time "0" and "1" time. For example, if the base coin is €1, when 2 coins of 50 cents (€1) enters the machine, there will be a counter pulse to increment the counter, or when 5 coins of 20 cents (€1) enter the machine there will also be a credit on the counter. This output pin signal is configurable.
- **Available Credit** signal. Generally used to illuminate a lamp indicating the user's credit. This output pin signal is configurable.
- **Warning** signal. It is triggered when the time to complete the service is nearing. The value of the time left of the service is configurable.

3.4 Validator AC-DSP in Credit mode.

The operation of the validator in credit mode gives a credit signal to achieve the programmed price. This signal will be a configurable in the "1" time and the "0" time.

The pinout of the connector J1 in this operating mode is as follows:

Connector J1 Output module		
Pins	**Function**	**Notes**
Pin 1	GND	
Pin 2	12-24 Vdc	Minimum: + 10 Vdc; Maximum: +27 Vdc
Pin 6	Input	Inhibition of coins/service request
Pins 3, 4, 5,7,8,9 and 10	Output	Outputs available for Credit, Counter, Available credit

Table 5. Pinout for Credit mode

These validators offer two operating modes:

- **Working with continuous pulses.**

  When the programmed price is reached (or exceeded), the validator automatically and continuously gives credit pulses corresponding to the amount introduced.

  Input pin 6 serves as inhibition in the acceptance of coins. The range of inhibition is configurable.

  Example:

  Price: **€ 1**

  Pulses for this price: **5 pulses**

  The user introduces **€ 2**

  The validator immediately provides 10 pulses to the corresponding pin.

- **Working in Service Request Mode.**

  When the programmed price is reached (or exceeded) the user needs to request the service on pin 6 to obtain a service. Once this happens, the corresponding service credits will be supplied.

If the remaining amount is sufficient to provide another service, a new request is required to obtain the service.

The request signals are sent to pin 6 one by one. For this to happen pin 6 must produces a change of status "inactive" state (which can be "0" or "1" as is configured) to the "active" state for a minimum of 50 milliseconds. We need this pin to go back to the standby state for a minimum time of 50 milliseconds to make the sale of the next service.

Figure 4. Signal Times

If the introduced amount was higher than the amount required, but insufficient to reach the value of the price programmed, the remaining value will be stored.

Example:

Price: **€ 1**

Signal for this price: **60 seconds**

The user introduces **€ 2**

Until the user requests the service on 6 pin, the validator will not work. Once the user requests the service, the validator will give 5 pulses to the corresponding pin. A new service request is required to obtain the remaining 5 pulses.

In both working modes described above, you may obtain several signals which provide information on the Status of the validator:

- **Counter** signal. It is used to count the base coin values that are introduced into the machine. It is variable and configurable, time "0" and "1" time. For example, if the base coin is €1, when 2 coins of 50 cents (€1) enters the machine, there will be a counter pulse to increment the counter, or when 5 coins of 20 cents (€1) enter the machine there will also be a credit on the counter. This output pin signal is configurable.
- **Available Credit** signal. Generally used to illuminate a lamp indicating the user's credit. This output pin signal is configurable.

4 MODIFIABLE OPERATING PARAMETERS

The following indicates the operating parameters of the validator that can be modified directly on the validator through the dipswitches or Azkoyen hardware/software tools

4.1 Modifiable parameters using dip switches.

Using the 4 available dip switches on the validator, it is possible to modify some settings without using any external tool. The following table shows parameters that may be changed with the switches as well as the position of the switches.

Parameters	SW1	SW2	SW3
Price of Service	0	0	0
Coins accepted	1	0	0
Time of service	0	1	0
Programming Token 1	1	1	0
Programming Token 2	0	0	1
Wide Tables	1	0	1
Bonus	0	1	1

Table 6. Modifiable parameters using switches.

To programme the parameters with *dipswitches,* follow the steps below:

1. Place **SW3**, **SW2** and **SW1** dipswitches with the parameter settings to modify according to table 6.
2. Put dipswitch SW4 ON. The electromagnet on the acceptance gate will make a short "click".
3. Do the appropriate action to set the parameter (see specific indications in paragraph 4.1.1)
4. Put dipswitch SW4 OFF. If the programming was correct, the solenoid on the acceptance gate will make a long "click". If the programming was not correct, the solenoid on the acceptance gate will **NOT** "click" and you will have to repeat the process from the start.

4.1.1 How to programme each parameter correctly.

- **Service price:** enter the amount of coins you need to reach the price according to the value of each coin. The programmed price shall be the sum of the values of the

introduced coins. If the validator rejects the coin it will not count for the price programming.

- **Coins accepted:** introduce one of each coin that you want to admit. Other coins available on the validator will be inhibited and it will not accept them.
- **Service time:** enter the amount of coins you need to reach the time requested according to the value for time of each coin. The time assigned to each coin should be specified.

  Maximum value programmable 65,535 seconds.

  If during the programming, the introduced coin causes the maximum value to be exceeded, it will be not accepted and its value will not count for the programming.

  If the coin is rejected or does not validate properly, it will not be used for programming.

- **Token 1 / Token 2**

  1. Place the dipswitches to be programmed for token 1 or token 2.
  2. Put dipswitch SW4 ON. The electromagnet on the acceptance gate will make a short "click".
  3. Introduce a minimum of 25 tokens that you wish to programme.
  4. Put dipswitch SW4 OFF. If the programming was correct, the solenoid on the acceptance gate will make a long "click". If the programming was not correct, the solenoid on the acceptance gate will **NOT** "click" and you will have to repeat the process from the start.

  To programme the second token, it is necessary to repeat the process.

  The value of tokens are fixed (value is implemented in factory when the validator is programmed) and only you can modify them with a Terminal TL20 or similar.

- **Activate / Deactivate Wide Tables and Bonus.**

  The process to follow to **activate** wide tables / bonus is as follows:

  1. Place the SW1, SW2, SW3 dipswitches with corresponding configuration.
  2. Put dipswitch SW4 ON. The electromagnet on the acceptance gate will make a short "click".

3. To activate the Bonus, introduce a valid coin that will be accepted. If the *validator* rejects it, introduce another coin.
4. Put dipswitch SW4 OFF. If the programming was correct, the solenoid on the acceptance gate will make a long "click". If the programming was not correct, the solenoid on the acceptance gate will **NOT** "click" and you will have to repeat the process from the start.

The process to follow to **deactivate** wide tables / bonus is as follows:

1. Place the SW1, SW2, SW3 dipswitches with corresponding configuration.
2. Put dipswitch SW4 ON. The electromagnet on the acceptance gate will make a short "click".
3. Place dipswitch SW4 in the OFF position. The electromagnet on the acceptance gate will make a long "click".

4.2 Parameters that are configurable using Tools.

As already mentioned in this manual, the modular validator AC-DSP is characterized by its high configurability by the user.

Below are all parameters that can be configured depending on the particular needs of each client, using the Azkoyen tools available.

GENERAL PARAMETERS	
PARAMETER	DESCRIPTION
Recuperation code	Assign code to the acceptance gate
Reject code	Assign code to the rejected coins
Inhibition/ Service request level (pin 6). **	Assign voltages 5/0 volts to the logic levels 1/0
Activate / Deactivate Wide tables	
Activate / Deactivate Bonus	
Output signal levels. **	Assign voltages 5/0 volts to the logic levels 1/0
Tokens	Assign values of the tokens

PARAMETERS IN PARALLEL MODE	
PARAMETER	DESCRIPTION
Assigning coin outputs	
Length of output pulse	

PARAMETERS IN TIMER MODE	
PARAMETER	DESCRIPTION
Operating mode	Continuous / Service request / Continuous with Service request
Price of service	
Time of service	
Pin of timer	
Available credit pin	
Counter activated YES/NO	
Pin counter (default pin 8)	
Time ON of counter	
Time OFF of counter	
Pin warning	
Time of warning pulse	

PARAMETERS IN CREDIT MODE	
PARAMETER	DESCRIPTION
Activate/Deactivate bonuses and their values	
Operating mode	Continuous / Service request
Values of the tokens	
Credit pin	
Available credit pin	

Time ON of credit pulse	
Time OFF of credit pulse	
Counter activated YES/NO	
Pin counter (default pin)	
Time ON of counter	
Time OFF of counter	

Table 7. Configurable Parameters

** Although the logical value of the signals is a configurable parameter by the user, it may be useful know factory default settings

- LOGIC LEVEL 0: From 0 volts to 0.7 volts.
- LOGIC LEVEL 1: From 4 volts to 5 volts.

5 AZKOYEN TOOLS.

5.1 HEUS.

The HEUS (user tool) software has two basic applications in the management of AC-DSP validators.

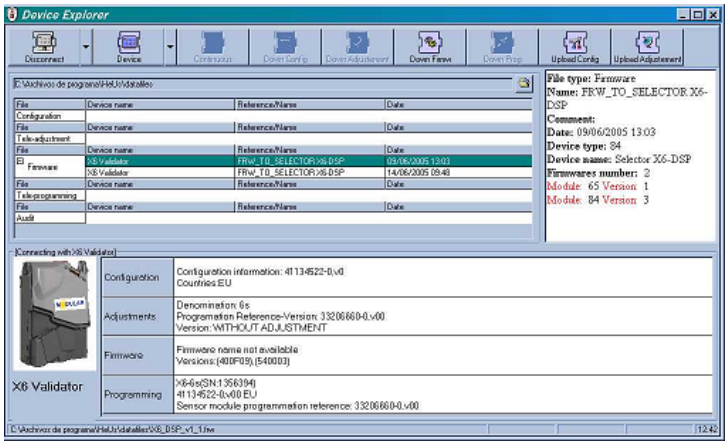


Figure 5. HeUs

- A tool for editing and modification of settings. It allows you to modify each one of the characteristic values in this range of validators detailed in paragraph 4.2.

- A tool for uploading files for configuration and programming. You can download files directly from your PC with the validator tool HEUS.

Communication between PC (HEUS) and the validator is done via cable right directly from the RS232 port of the PC to the 4-way connector J2 on the validator.

> The 12/24 V power supply will not power the validator through this connector, it will always be necessary to maintain the validator powered through the J1 connector.

To know the details of the implementation and management of the HEUS, consult the specific manual available on the Azkoyen website http://sat.azkoyen.com.

5.2 TL20.

The TL20 is a hardware tool that is used to upload files for programming and configuration in AC-DSP validators.

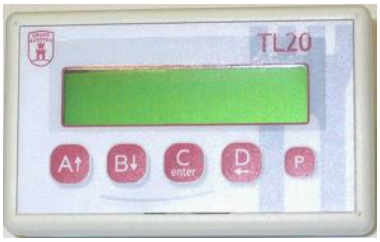


Figure 6. TL20

The TL20 programmer will connect to the validator on the 4-way connector on the validator module J2.

> The 12/24 V power supply will not power the validator through this connector, it will always be necessary to maintain the validator powered through the J1 connector.

To know the details of the implementation and management of the TL20, consult the specific manual available on the Azkoyen website http://sat.azkoyen.com.

5.3 Simulation / Verification tool: IS21-A

The IS21-A interface allows us to verify the proper functioning of the validator as it simulates the behaviour of a machine.

There are numerous configuration switches as well as a Display to setup different working modes in the validator.

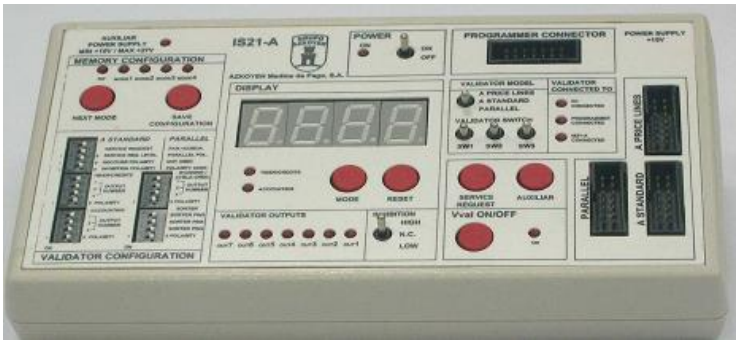


Figure 7. IS21-A

To know the details of the implementation and management of the IS21-A, consult the specific manual available on the Azkoyen website http://sat.azkoyen.com.