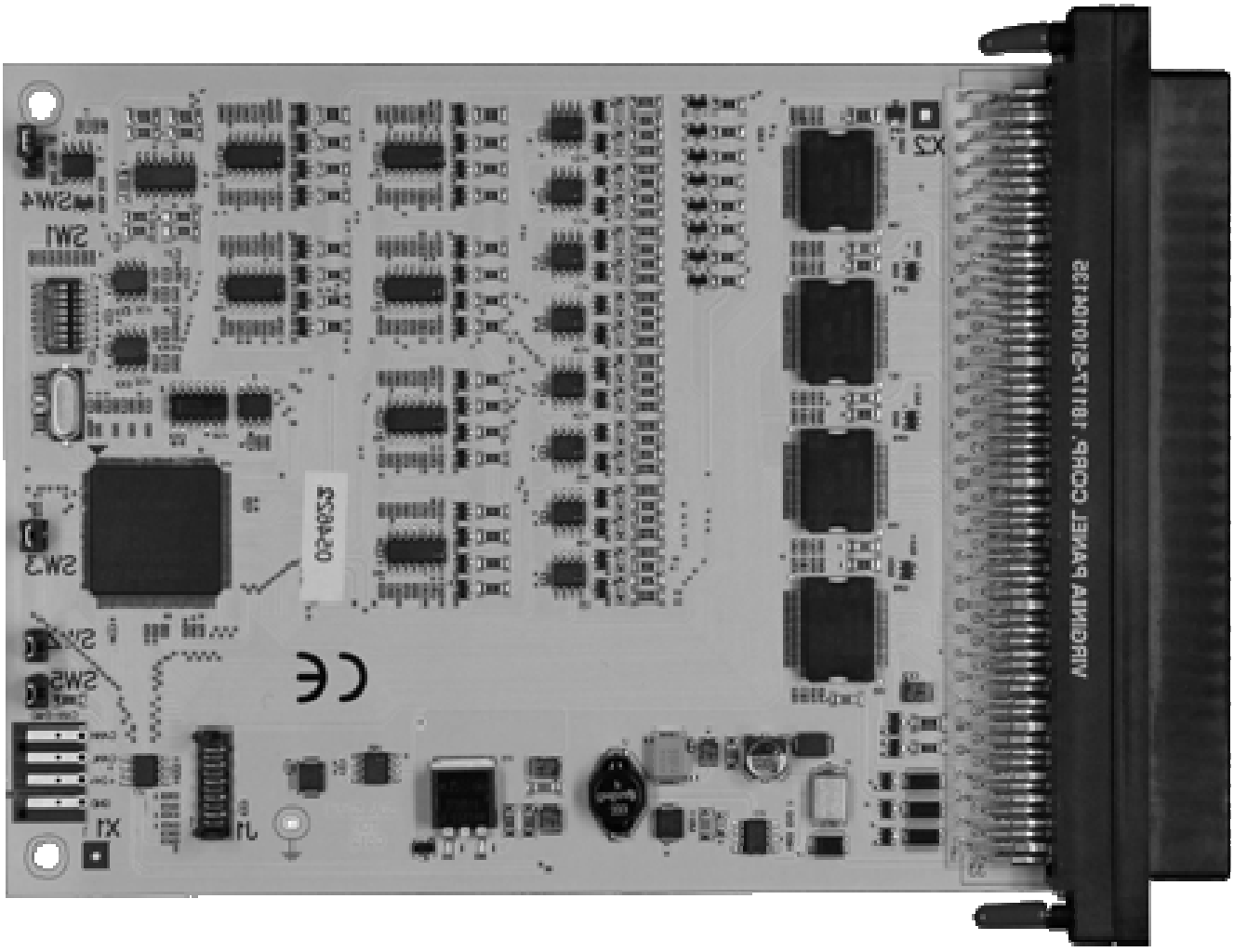
Multifunction module

YAV90832

620022E2

Created 7/07/09
Updated 25/03/10



This manual is related to the following product :

Product – P/N	**YAV90832**	
Hardware version	**01.01**	
Sofware version	**03.02**	
Issued date	**23/01/2010**	

Check signatures

Structure Sales	Contents Integrtation Mgr	Schematics R+D	Technical features R+D (Lab)

Document History

Version	Issued date	Reason
V1	09/2006	Preliminar version
V2	03/2010	

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This technical information has been produced, written and checked ensuring the greatest accuracy and simplification. Despite this, should you find any mistake or detail that could contribute to improving the product or its documentation, we would appreciate you letting us know. Your contribution will be very welcome.

0. Safety

Follow the following safety measures to avoid and prevent damaging this product, products connected to it, or people.

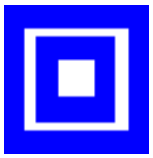
Only qualified and entitled[1] personnel are authorized to carry out operations of installation and routine on the devices described in this manual. The company installing it would bear responsibility for any security or operating failure of the lift, when such failure is due to the parameters incorrect programming.

The product described in this manual can be configured to comply with the ruling of different countries. The manufacturer does not hold any responsibility if the company installing it does not configured it according to the legal, commercial or security prescriptions that may be in force in the place of installation or otherwise agreed with the customer.

Should you need to access other components of the system while you are using this product, as a measure of precaution, read the *General Safety Summary* in the other products manual.

0.1 Symbols and safety terms

The following symbols may appear on the product or its documentation

			
DANGER High Voltage	Earth protection	WARNING See manual	Double isolation

Consult the specifications of the product for IEC Installation Category and Safety Classification.

0.2 Precautions against damage to people

Do not work on the product with the power on.

To avoid electrical discharge, this product must not be handled with the system powered on and in any case can operate without the protective covers.

The device has mobile parts that can be in motion by operating electric or electronic control units.

Before starting any operation, make sure that there are no people who could be affected by any moving part.

Check through-out each one of the security devices before the unit comes into operation.

Each one of the safety switches must be individually checked and, under no circumstances, the device must remain on service without ensuring the correct operation of the security devices.

[1] The qualified staff must have proved their technical knowledge of this product and should have the corresponding accreditation.

0.3 Precautions against damage to the product

Do not insert / unplug cards or other electronic elements when powered up	The connection/disconnection of the I/O's when plugged to the power could produce a sequence of connections that could damage electronic components which had been previously connected to their corresponding reference earth.
Do not use insulation testers.	The insulation testers work at very high voltages, and are capable of destroying the semiconductors. Under no circumstances should the "Megger" type of testers be used between electronic systems.
Do not force the connection tag strips	The connection tag strips are connected exerting a small pressure. If you encounter difficulty to plug them this may mean that they are upside down or not aligned. If they are forced, besides the damage to the strip you can cause damages on the electronics.
Secure the ground connections quality.	All the ground connections must be star-type and with the suitable section. Loop ground connections are potential receptor antennas with capacity to generate important current peaks.
Use suitable packing material for transportation	An electronic module with a lot of fragile components should be transported with a good protection packaging. A collision can cause damages that could appear long time after the start up.
Do not install this product near heat sources, strong vibrations or high humidity that exceeds the technical specifications.	Check that the product works without vibrations that exceed the maximum levels specified, and which could damage its integrity or cause a contact to become disconnected. The product should work without humidity and in the temperature range detailed in the technical specifications.

0.4 Limits of the guarantee

1. Products are supplied to the latest available development state at the time of manufacture. Should there be any future changes for functional or productive improvements of the products; the manufacturer does not hold any obligation to reprocess at no charge the products that have been already manufactured to upgrade them to the latest versions.
2. All the products supplied by S.A. Sistel have passed all established quality controls as well as the EMC (Electromagnetic Compatibility Checks). The manufacturer cannot be held responsible for any damage produced by defective manipulation, installation or incompatibility with other products.
3. The products' guarantee will only be in force when the installation has been done in accordance with the technical prescriptions in this manual and the settled general

standards: Low Voltage Electro Technical Regulation (or equivalent for each country) and CE regulations for the Electromagnetic Compatibility.

4. The commutation of highly unsettling loads nearby (Frequency converters, doors operators, coils, fluorescent lamps, contactors, etc.), require the installation of the corresponding interference suppression/reduction resources and connections to earth are required[2]. If these requirements are not followed or are defectively installed there may be severe failures in the electronic devices, for which the installing company will be held responsible.
5. All equipment under guarantee that be sent for repair must have the manufacturing label with its serial number
6. The guarantee period is two working years.
7. Device operation under thermal or voltage conditions out of technical specifications detailed in this operation manual cancels guarantee terms.

[2] RF filters on the input and output frequency converters, RC net, diodes and/or varistors in the coils, screened cables in the VVVF motors, screened starters, etc.

1. General description of the module

1.1 Characteristics

- **40 inputs: 16 unipolar 10 bit Analog & three groups of 8 (24 in total) digital input with selectable voltage level**
- **32 Outputs (MOS) with independent supply in groups of 8 protected and monitored**
- **4 analog outputs, unipolar from 0..+15Vdc**
- **4 PWM outputs**
- **Powerful commands to read the values with triggered automatic filters**
- **VPC tripaddle connector**
- **CAN bus controlled, with address and speed selection**
- **National Instruments Lab View drivers**

1.2 Description

YAV90832 inputs and outputs are sharing the common from the 24Vdc power supply. This common must be connected to the DUT common to operate.

Analog inputs accept up to +15Vdc voltages with an acquisition resolution of 10 bits ±1. They are protected up to +50V.

Digital inputs are organized in groups of 8, conforming banks. The first bank has 16 inputs while the second one has 8 inputs. Each bank has a terminal to set the voltage level to judge the digital value. The board features two reference outputs available (+2,5V and +5V) to be used as trigger level, ina direct manner or through a voltage divider.

Digital Outputs are organized in groups of 8. Each group has an independent supply voltage pin. They can work from +11Vdc to +45Vdc, sourcing up to 600mA. Failure monitoring for each group is available.

6 outputs can be used either as powered digital outputs (from terminal 89 to terminal 96) or as modulated outputs: additional four analog ports (from 57 to 60) and four PWM ports (from 61 to 64). When modulated outputs are being used (analog or PWM), the logical status of the digital outputs will be a squared wave which is ON time proportional to the value of that modulated output.

Digital inputs 21-23 and 22-24 can be set as incremental encoder iputs (two cannel 90º quadrature, up to 1MHz)

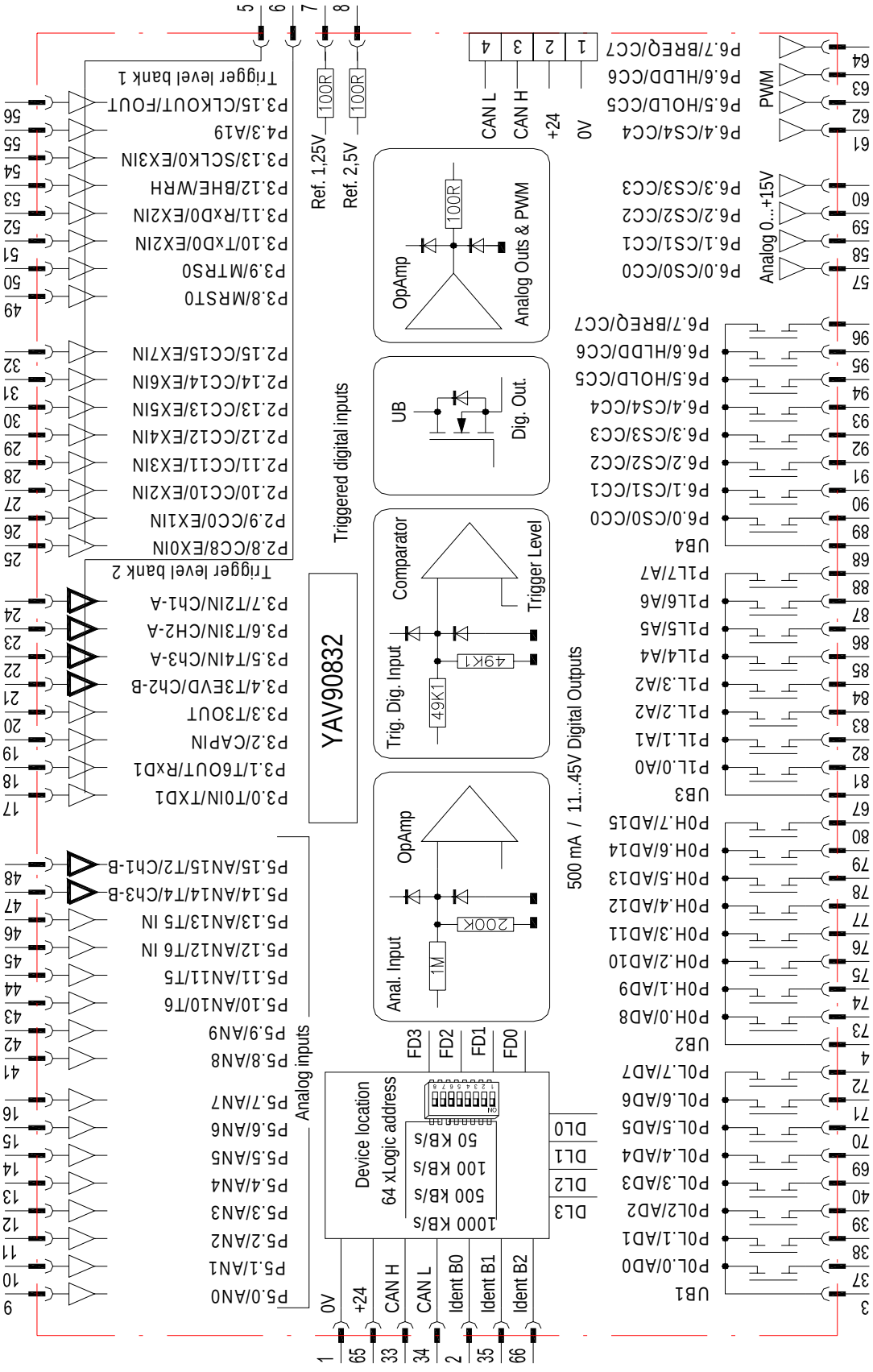
1.3 Applications

- **Digital signals monitoring**
- **Analog input and output**
- **Encoder emulator**
- **Fast counters**
- **Relay and/or load actuators**

1.4 Technical data

Parameter	Pnemonic	Condition	Value			Units
			Min	Nominal	Max	
Analog inputs						
Voltage measurement	V_{AIN}		0		15	V_{DC}
Input impedance	R_{AIN}		-	1.2	-	MΩ
Measuremnet resolution	MR		-	10	-	Bits
Maximum uncertanty				± 1		Bit
Digital inputs PNP						
Input voltage	V_{DIN}		0		30	V_{DC}
Input impedance	R_{DIN}			100		kΩ
Hysteresis	V_{HIS}					mV
Trigger level voltage for logic 1	V_{TRG}		2,5		5	kΩ
Encoder inputs						
Trigger voltage	V_{DIN}					V_{DC}
Maximum counting frequency	F_{MAX}					Hz
Voltage references						
2V5 Voltage reference	V_{R2V5}		2.475	2.500	2.525	V_{DC}
Internal resistance	R_{R2V5}			100		Ω
Tensión de referencia 1V25	V_{R10V}		1.237	1.250	1.2625	VDC
Resistencia interna	R_{R10V}			100		kΩ
Digital Outputs PNP						
Current	I_{OUT}	Permanent	-	625	-	mA
Internal resistance	R_{OUT}	On mode	-	200	-	mΩ
Working voltage	V_{OUT}		11	-	45	V_{DC}
Working temparature	T_{WRK}		5	-	65	ºC
Analog Outputs						
Short circuit current Source mode (V=0V)	$I_{OUTSource}$	Permanent	16	16	16	mA
Short circuit current Sink mode (V=0V)	$I_{OUTSink}$	Permanent	11	11	11	mA
Internal resistance	R_{OUT}			100		Ω
Output Voltage	V_{OUT}		0	-	15	V_{DC}
PWM Outputs						
Current	I_{OUT}	Permanent		625		mA
Frequency (variable duty cycle)	F_{OUT}			10		kHz
Internal resistance	R_{OUT}			200		mΩ
Working voltage	V_{OUT}		3		50	V_{DC}

1.5 Module functional block



1.6 Pin out

Module function	Receiver Pos. #	
YAV90832 : PNP 38 IN / 32 OUT	I.T.A. Module P/N	510 108 126
	I.T.A. contact P/N	610 110 108
	I.T.A. Patchcord	720 102 101

Pin	Description	Pin	Description	Pin	Description
1	GND	33	CAN H	65	+24V
2	IDENT – B0	34	CAN L	66	IDENT – B2
3	+UB1	35	IDENT . B1	67	+UB3
4	+UB2	36		68	+UB4
5	Bank 1 trigger level input	37	PNP Digital output 0	69	PNP Digital output 4
6	Bank 21 trigger level input	38	PNP Digital output 1	70	PNP Digital output 5
7	5V trigger level output	39	PNP Digital output 2	71	PNP Digital output 6
8	2V5 trigger level output	40	PNP Digital output 3	72	PNP Digital output 7
9	Analog input 0	41	Analog input 8	73	PNP Digital output 8
10	Analog input 1	42	Analog input 9	74	PNP Digital output 9
11	Analog input 2	43	Analog input 10	75	PNP Digital output 10
12	Analog input 3	44	Analog input 11	76	PNP Digital output 11
13	Analog input 4	45	Analog input 12	77	PNP Digital output 12
14	Analog input 5	46	Analog input 13	78	PNP Digital output 13
15	Analog input 6	47	*Analog input 14 / Encoder 3 ChB*	79	PNP Digital output 14
16	Analog input 7	48	*Analog input 15 / Encoder 1 ChA*	80	PNP Digital output 15
17	Digital input 0	49	Digital input 16	81	PNP Digital output 16
18	Digital input 1	50	Digital input 17	82	PNP Digital output 17
19	Digital input 2	51	Digital input 18	83	PNP Digital output 18
20	Digital input 3	52	Digital input 19	84	PNP Digital output 19
21	*Digital input 4/ Encoder 2/ChB*	53	Digital input 20	85	PNP Digital output 20
22	*Digital input 5/Encoder 3/ChA*	54	Digital input 21	86	PNP Digital output 21
23	*Digital input 6/Encoder 2/ChA*	55	Digital input 22	87	PNP Digital output 22
24	*Digital input 7/Encoder 1/ChA*	56	Digital input 23	88	PNP Digital output 23
25	Digital input 8	57	Analog Output 0	89	PNP Digital output 24
26	Digital input 9	58	Analog Output 1	90	PNP Digital output 25
27	Digital input 10	59	Analog Output 2	91	PNP Digital output 26
28	Digital input 11	60	Analog Output 3	92	PNP Digital output 27
29	Digital input 12	61	PWM 1 /Digital P6.4	93	PNP Digital output 28
30	Digital input 13	62	PWM 2 /Digital P6.5	94	PNP Digital output 29
31	Digital input 14	63	PWM 3 /Digital P6.6	95	PNP Digital output 30
32	Digital input 15	64	PWM 4 /Digital P6.7	96	PNP Digital output 31

2. Certifications

89/336/CEE Directive
Declaration of Conformity

S.A. Sistel declare, under our sole responsability, that the product

YAV90832 – Multifunctionboard with 80 in/out

to which this declaration relates, meets the provisions of the EU Directives listed below:

- Electro Magnetic Compatibility (EMC) directive, 89/336/ECC referreing to
- Low voltaje directive, 73/23/EEC

and therefore, the CE mark showed below is applied.

For accessories or other elements that can be connected to this product, see their corresponding Declaration of Conformities

The conformity mark is given by the CE mark and the year when it was applied

CE

Authorized by:

Representative: Jordi Batet
Title: General Manager

Company: SA Sistel - Barcelona

Barcelona, January 7th 2010

3. CAN messages

Following you will find the CAN messages available for communicating and operating with YAV90832

YAV90832

Action	Dir	Ident	Length	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Set OFF One Relay	Rx	0x155101xx	4	0x01	0x01	Relay	0x00				
Set ON One Relay	Rx	0x155101xx	4	0x01	0x01	Relay	0x01				
TOGGLE One Relay	Rx	0x155101xx	4	0x01	0x01	Relay	0x02				
BLINK One Relay	Rx	0x155101xx	4	0x01	0x01	Relay	0x03				
PULSE ON One Relay	Rx	0x155101xx	5	0x01	0x01	Relay	0x04	Time (10ms)			
PULSE OFF One Relay	Rx	0x155101xx	5	0x01	0x01	Relay	0x05	Time (10ms)			
ASK One Relay	Rx	0x155101xx	3	0x01	0x02	Relay					
One Relay Status	Tx	0x155201xx	4	0x01	0x02	Relay	Status				
Set OFF Several Relays	Rx	0x155101xx	7	0x01	0x03	Relays 0	Relays 1	Relays 2	Relays 3	0x00	
Set ON Several Relays	Rx	0x155101xx	7	0x01	0x03	Relays 0	Relays 1	Relays 2	Relays 3	0x01	
TOGGLE Several Relays	Rx	0x155101xx	7	0x01	0x03	Relays 0	Relays 1	Relays 2	Relays 3	0x02	
BLINK Several Relays	Rx	0x155101xx	7	0x01	0x03	Relays 0	Relays 1	Relays 2	Relays 3	0x03	
PULSE ON Several Relays	Rx	0x155101xx	8	0x01	0x03	Relays 0	Relays 1	Relays 2	Relays 3	0x04	Time (10ms)
PULSE OFF Several Relays	Rx	0x155101xx	8	0x01	0x03	Relays 0	Relays 1	Relays 2	Relays 3	0x05	Time (10ms)
Set OUT All Relays	Rx	0x155101xx	7	0x01	0x03	Relays 0	Relays 1	Relays 2	Relays 3	0x06	
ASK ALL Relays	Rx	0x155101xx	3	0x01	0x04	Autosend					
All Relays Status	Tx	0x155201xx	6	0x01	0x04	Relays 0	Relays 1	Relays 2	Relays 3		

Action	Dir	Ident	Length	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
All Fault Status	Tx	0x155201xx	3	0x01	0x10	Faults					

Action	Dir	Ident	Length	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Read I2C Data Word 24LC256	Rx	0x155101xx	5	0x01	0xFA	0xF1	ADD LOW	ADD HIGH			
Write I2C Data Word 24LC256	Rx	0x155101xx	7	0x01	0xFA	0xF2	ADD LOW	ADD HIGH	DAT LOW	DAT HIGH	
Write I2C Page (32 Words) 24LC256	Rx	0x155101xx	7	0x01	0xFA	0xF3	ADD LOW	ADD HIGH	DAT LOW	DAT HIGH	
Write I2C All (16384 Words) 24LC256	Rx	0x155101xx	5	0x01	0xFA	0xF4	DAT LOW	DAT HIGH			
Data Word Readed I2C 24LC256	Tx	0x155201xx	7	0x01	0xFA	0xF1	ADD LOW	ADD HIGH	DAT LOW	DAT HIGH	
Action I2C OK 24LC256	Tx	0x155201xx	3	0x01	0xFA	0xF2					
Action I2C NOT OK 24LC256	Tx	0x155201xx	3	0x01	0xFA	0xF3					

Action	Dir	Ident	Length	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Set PWM Output (MAX=2047)	Rx	0x155101xx	5	0x01	0x41	CHANN	PWM0	PWM1			
RESET ALL Analog Outs	Rx	0x155101xx	3	0x01	0x45	0x00					
New Set PWM Output MAX=2047	Rx	0x155101xx	6	0x01	0x45	0x01	CHANN	PWM0	PWM1		
Analog OUT OK	Tx	0x155201xx	3	0x01	0x45	0x01					
Set Low Level Out Calibration	Rx	0x155101xx	6	0x01	0x45	0x03	CHANN	LOW0	LOW1		
Set SPAN Analog Out Calibration	Rx	0x155101xx	6	0x01	0x45	0x04	CHANN	CAL0	CAL1		
ASK Analog Out Status	Rx	0x155101xx	3	0x01	0x45	0x02					
BLOCK0 Analog Out Status	Tx	0x155201xx	7	0x01	0x45	0x10	AN00L	AN00H	AN01L	AN01H	
BLOCK1 Analog Out Status	Tx	0x155201xx	7	0x01	0x45	0x11	AN02L	AN02H	AN03L	AN03H	
BLOCK2 Analog Out Status	Tx	0x155201xx	7	0x01	0x45	0x12	AN04L	AN04H	AN05L	AN05H	
BLOCK3 Analog Out Status	Tx	0x155201xx	7	0x01	0x45	0x13	AN06L	AN06H	AN07L	AN07H	

Action	Dir	Ident	Length	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Ask Analogic Inputs Enables	Rx	0x155101xx	3	0x01	0x40	0x01					
Analogic Inputs Enables Status	Tx	0x155201xx	5	0x01	0x40	0x01	ENA0	ENA1			
Enable Analogic Input Channels	Rx	0x155101xx	6	0x01	0x40	0x02	ENA0	ENA1	AutoSend		
Ask Analog Input Value	Rx	0x155101xx	4	0x01	0x40	0x03	CHANN				
Analog Input readed (MAX=2047)	Tx	0x155201xx	6	0x01	0x40	0x03	CHANN	ADC0	ADC1		
Start Analog Input Calibration	Rx	0x155101xx	4	0x01	0x40	0x04	CHANN				
Abort Analog Input Calibration	Rx	0x155101xx	4	0x01	0x40	0x05	CHANN				
Store Analog Input Calibration	Rx	0x155101xx	4	0x01	0x40	0x06	CHANN				
Span Analog Input Calibration	Rx	0x155101xx	6	0x01	0x40	0x07	CHANN	CAL0	CAL1		

Action	Dir	Ident	Length	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
ASK ALL Encoders	Rx	0x155101xx	5	0x01	0x42	0x01	ENCS	AutoSend			
Encoder Value Readed	Tx	0x155201xx	8	0x01	0x42	0x01	ENC	VAL0	VAL1	VAL2	VAL3
ASK Encoders Enables	Rx	0x155101xx	3	0x01	0x42	0x02					
Encoders Enables Status	Tx	0x155201xx	4	0x01	0x42	0x02	ENCS				
Enable Encoders Channels	Rx	0x155101xx	4	0x01	0x42	0x03	ENCS				
Start Encoders	Rx	0x155101xx	4	0x01	0x42	0x05	ENCS				
Stop Encoders	Rx	0x155101xx	4	0x01	0x42	0x04	ENCS				
Reset Encoders	Rx	0x155101xx	4	0x01	0x42	0x06	ENCS				

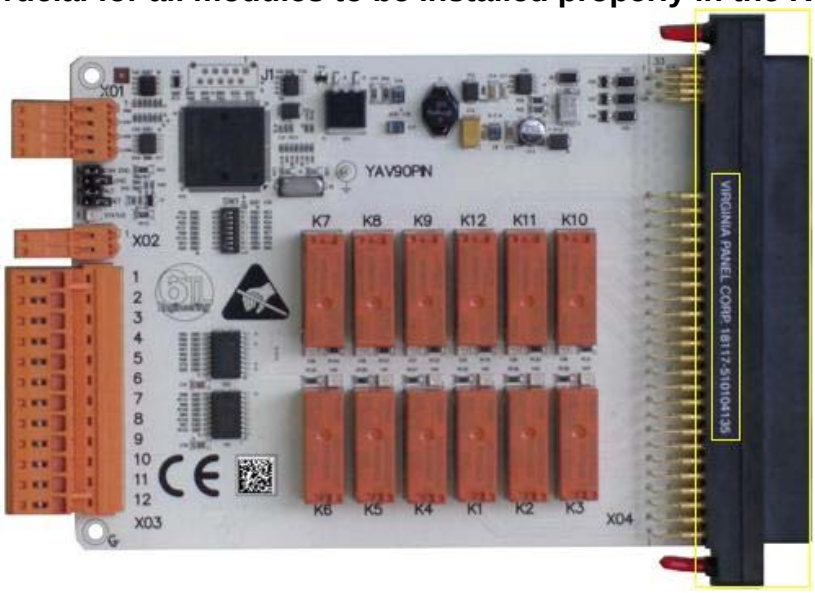
Action	Dir	Ident	Length	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
ASK One Input	Rx	0x155101xx	3	0x01	0x06	Input					
One Input Status	Tx	0x155201xx	4	0x01	0x06	Input	Status				
ASK ALL Inputs Status	Rx	0x155101xx	3	0x01	0x07	Autosend					
All Inputs Status	Tx	0x155201xx	6	0x01	0x07	Inputs 0	Inputs 1	Inputs 2	Inputs 3		

Action	Dir	Ident	Length	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Set SimEnc 0 Output CW	Rx	0x155101xx	7	0x01	0x43	0x00	TIM0	TIM1	CNT0	CNT1	
Set SimEnc 0 Output CCW	Rx	0x155101xx	7	0x01	0x43	0x01	TIM0	TIM1	CNT0	CNT1	
Set SimEnc 1 Output CW	Rx	0x155101xx	7	0x01	0x43	0x10	TIM0	TIM1	CNT0	CNT1	
Set SimEnc 1 Output CCW	Rx	0x155101xx	7	0x01	0x43	0x11	TIM0	TIM1	CNT0	CNT1	

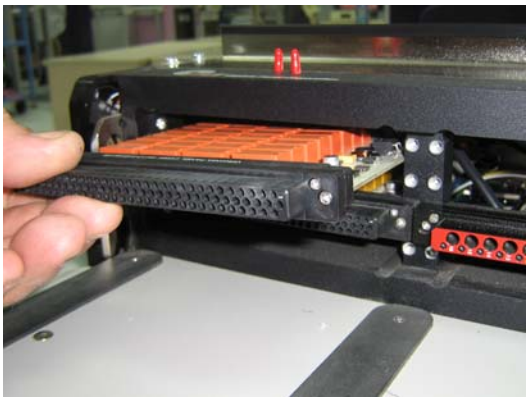
Action	Dir	Ident	Length	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Set PWM Sinus Output	Rx	0x155101xx	4	0x01	0x44	CHANN	OFF/ON				

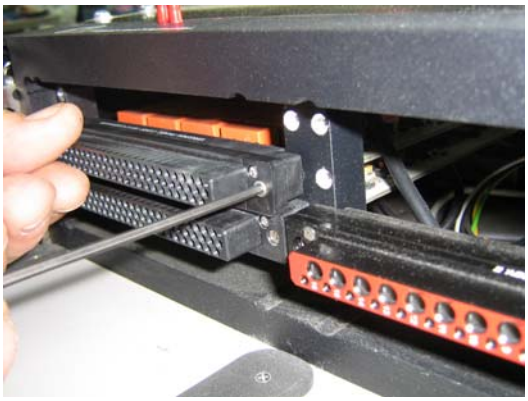
4. Install / Uninstall YAV boards into / from a VPC Receiver

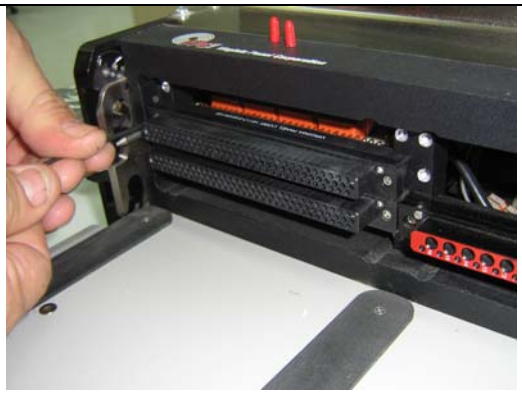
YAV boards are using a high reliable professional receiver connectors from VPC (Virginia Panel Corporation). **It is crucial for all modules to be installed properly in the Receiver.**



Following pictures are showing the sequence for mounting a YAV board into a VPC receiver. The boards are comming with Allen screws that will fit into receiver positions. 3/32 Allen Wrench is needed to screw the board into the receiver. Screw both sides evenly.





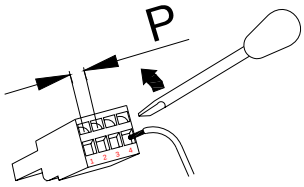


For uninstalling the boards, unscrew and hold the board with two hands from both sides and pull straight out.

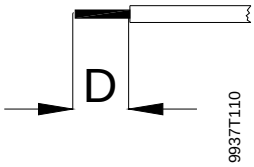
4.1 Conections

4.1.1 Connecting cables into YAV board terminals

Following table is to show the distance (D) at what we have to cut the isolation to connect a cable into the aerial clamp terminal that connects unto X1 of the YAV board.



P (mm)	D (mm)
3,5	6
5,08	10
7,62	10



5. Getting started with your YAV board

5.1 NI CAN board

To control the YAV board you will need a CAN interface. We recomend using NI-CAN, from National Instruments.

5.2 CAN bus wiring

- We need to supply CAN-H, CAN-L, +24Vdc and GND to X1 connector of the YAV board.

X1 connector of YAV board	
Pin	**Function**
1	0V
2	+24Vdc
3	CAN_Low
4	CAN_High

- 0V from NI-CAN and from YAV must be joined toghether in no galvanic isolation in the YAV.

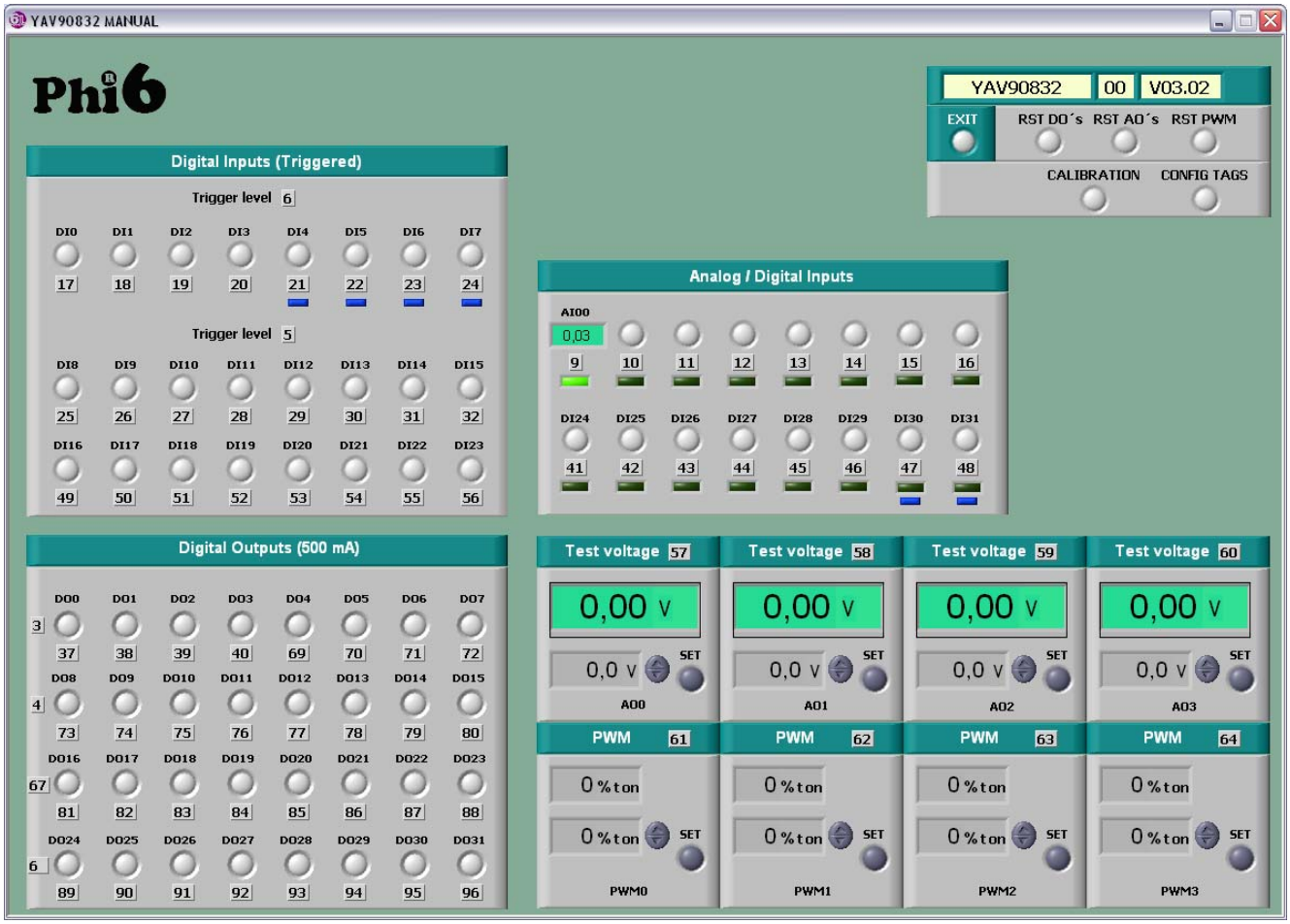
5.3 PHI6-EXPLORER

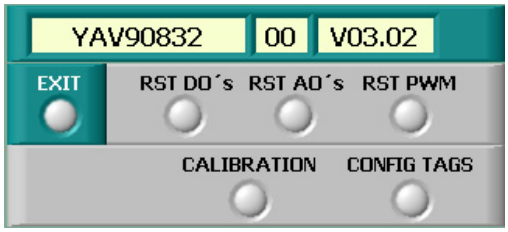
- Install the Software PHI6-EXPLORER to manually control the board. Refer to PHI-6 software manual, our reference 680020Ex.

6. Operating the board manually with PHI6-EXPLORER

6.1.1 Operator Panel for YAV9832

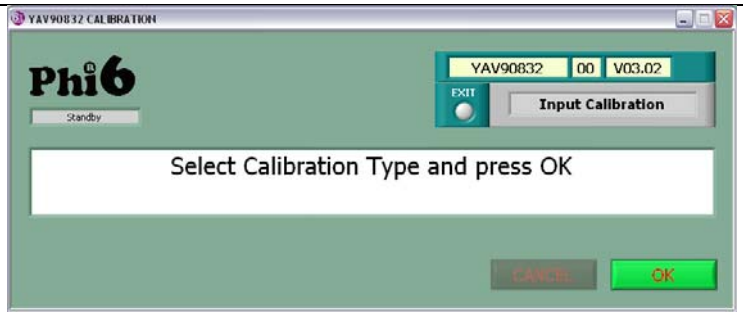
Through PHI6-EXPLORER we can operate the board manually:





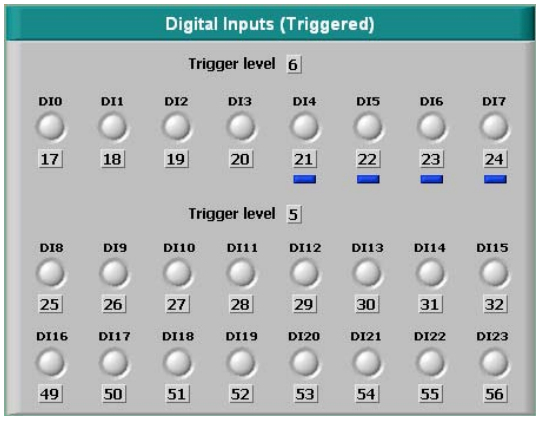
This box in the Operator Panel displays the module name: YAV90832 as well as the adress configured in the YAV board (SW1) and the firmware versión of the board.
RST DO's, **RST AO's** and **RST PWM** buttons will RESET respectively DO's, AO's and the PWM.

The **CALIBRATION** button will open the following window:



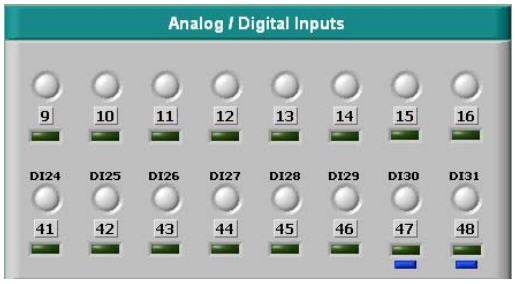
By following the instructions given by the display, we can go through all analog inputs and outputs and calíbrate them.

CONFIG TAGS button
From Phi6 Explorer we can easily edit the tag names of each channel, in order that when implementing your test executive sequence, it will be easier to recongnize the resources. Click the 'Config Tags' button at the top right side. Then an alias name for the board and a tag for each channel can be added. After making all changes click the Save Tags button to reflect the changes and the product configuration file will be automatically edited.



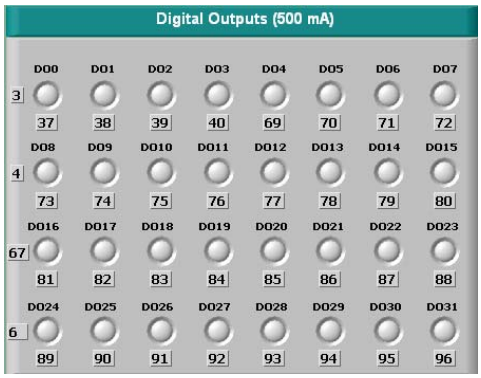
Digital Inputs
There are two Banks. First bank has 8 DI with the voltage level to change the logic level in pin number 6. The second bank, witn 16 DI's, has the voltage level that defines the status of the input in pin number 5.

DI's from 21 to 24 can be either DI's or encoder inputs.
Pin 21: Encoder 2, channel B
Pin 22: Encoder 3, channel A
Pin 23: Encoder 2, channel A
Pin 24: Encoder 1, channel A



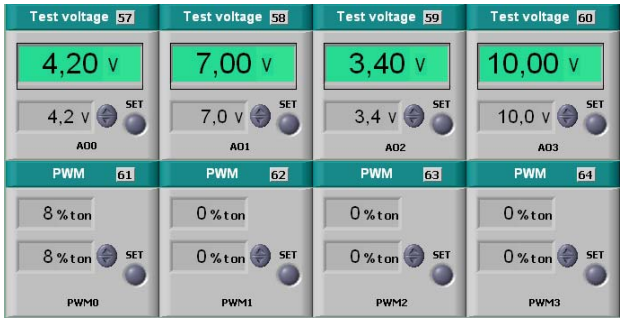
Analog / Digital Inputs
From 9 to 16, we have a bank of Analog inputs.
From 41 to 48, the inputs can be either DI or AI. When actuating as DI, the voltage level for having a logic 1 is 8,75V ±10%.

By pushing the green led below the pin number, the voltage read out of the channel will appear.
Pins 47 and 48 are, more over, Encoder channels:
Pin 47: Encoder 3, channel B
Pin 48: Encoder 1, channel B



Digital Outputs

There are four MOSFET DO Banks. Each one allows a different common voltage. These outputs are switching from 0 to 1 at 10V



Analog outputs

Each analog output has a display to show to the user the value that the board is giving. The operator can set the value by typing it in the box and pushing **SET**.

For each **PWM output**, we can select the duty cycle. One display is showing us the value that the output is giving, and the other one is for setting a new value.