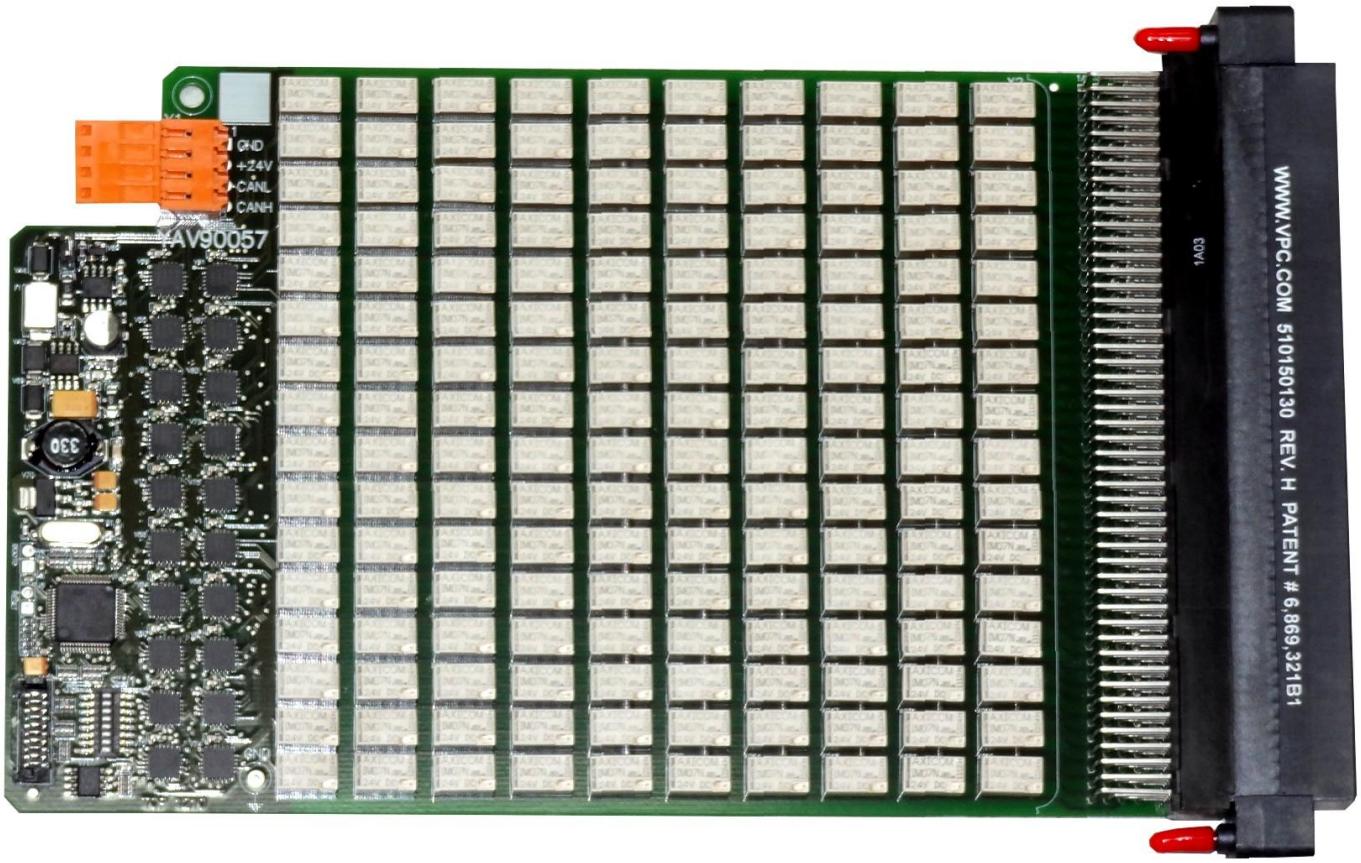
Created 12/02/13
Updated 12/02/13

160-Channels, 2A Mux./Matrix

YAV90057

620057E02



This manual is related to the following product:

Product – P/N	**YAV90057**
Version	**01.01**

Document History

Version	Issued date	Reason
E01	02/2013	First Release
E02	11/2015	CE Revision // Remove Packaging Chapter

Hardware History

Version	Issued date	Reason
01	02/2013	First Release

Software History

Version	Issued date	Reason
01	02/2013	First Release

S.A. Sistel Solsonès, 87-89 E-08211 BARCELONA

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0. Before you begin

Thank you very much for purchasing this system/module.

This manual contains the information of the characteristics, performance and usage of the system/module required for using it.

When using the system, observe the following:

- Read this manual carefully to understand the contents well, and make the proper use of this system accordingly.
- Keep the manual safely for ready reference at any time. For basic operation of the system/module,alse read the relevant manuals carefully to understand the contents well, and then make the proper use of this system accordingly.

1. 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.

1.1 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.

1.2 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.

1.3 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 years since invoicing date.
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.

2. Certifications

Declaration of Conformity

S.A. Sistel declare, under his sole responsibility, that the product

YAV90057– 160-Channel, 2A Relay Multi-configuration Multiplexer

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

- Electro Magnetic Compatibility (EMC) directive, 2004/108/CE refereeing to
- Low voltage directive, 2006/95/CE

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, July 15th 2012

3. Description and main features

The YAV module contents 160 SPST Relays, structured in 10 multiplexer branches of 16 relays. The branch commons are accessible from three connector pins in order to make easy the configurations in different multiplexer modes.

3.1 General features

- **160-Channels 2A SPST Relays**
- **500 V Isolation between banks**
- **CAN bus**
- **High density integration: Only 15 mm width**
- **LabView drivers available**

3.2 Applications

- Switching unit in ATE systems in single pole or multi-pole joining banks

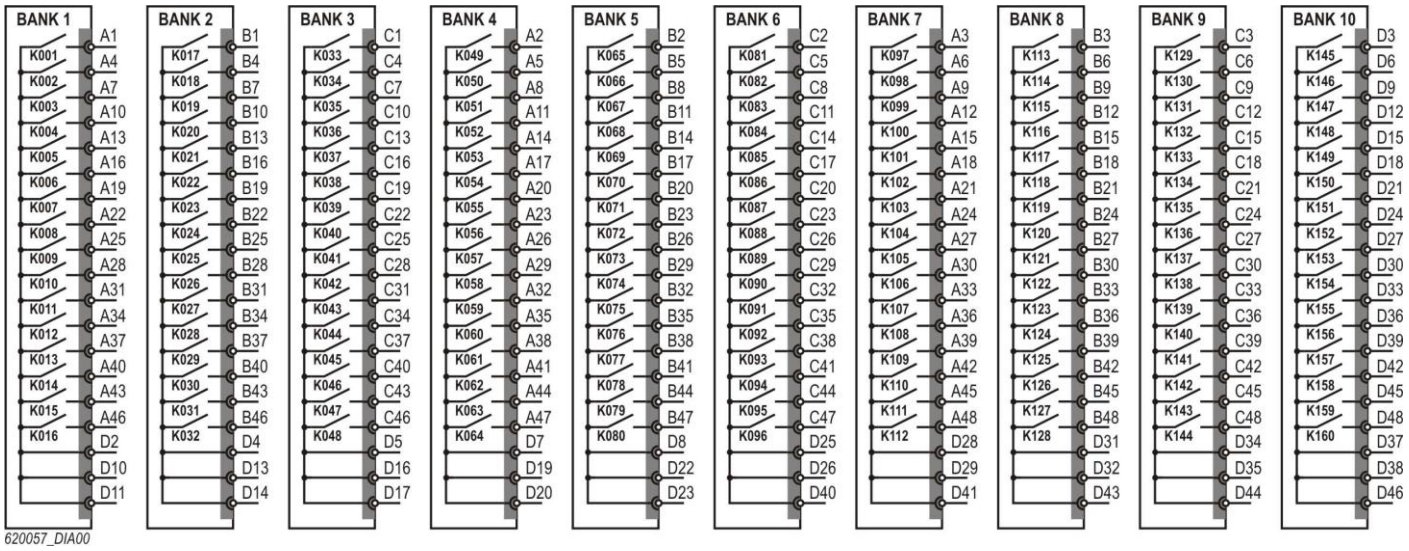
3.3 Ordering information

Descripción	P/N
160-Channel, 2A Relay Multiconfiguration Multiplexer Scope of supply: • Module P/N YAV90057 • 4 Pole 3,5 mm pitch Weidmüller connector (CAN and Power supply)	**YAV90057**

3.4 Device electrical Characteristics

Parameter At Te= 5 … 65ºC, unless otherwise specified	Symbol	Values			Unit
		Min.	Typ.	Max.	
Module Operating Parameters					
Control Voltage	Vcc	18	24	32	V_{DC}
Operating current @24V_{DC} and 160 relays ON	I_D	-	-	1.300	mA
Contacts Data					
Maximum switching voltage	V_{Max}	-	-	220 250	VDC VAC
Rated current	I_R	-	2	-	A
Limit continuous current	I_C	-	-	2	A
Switching power	P_s	-	-	60 62.5	W VA
Minimum switching voltage	Vmin	100	-	-	mV
Operate time	ton	1	-	3	ms
Release time	toff	3	-	5	ms
Bounce time	tbnc	-	1	5	ms
Initial contact resistance	<50mΩ at 10 mA/20 mV				
Thermoelectric potencial	<10mV				

3.5 Electric Diagram

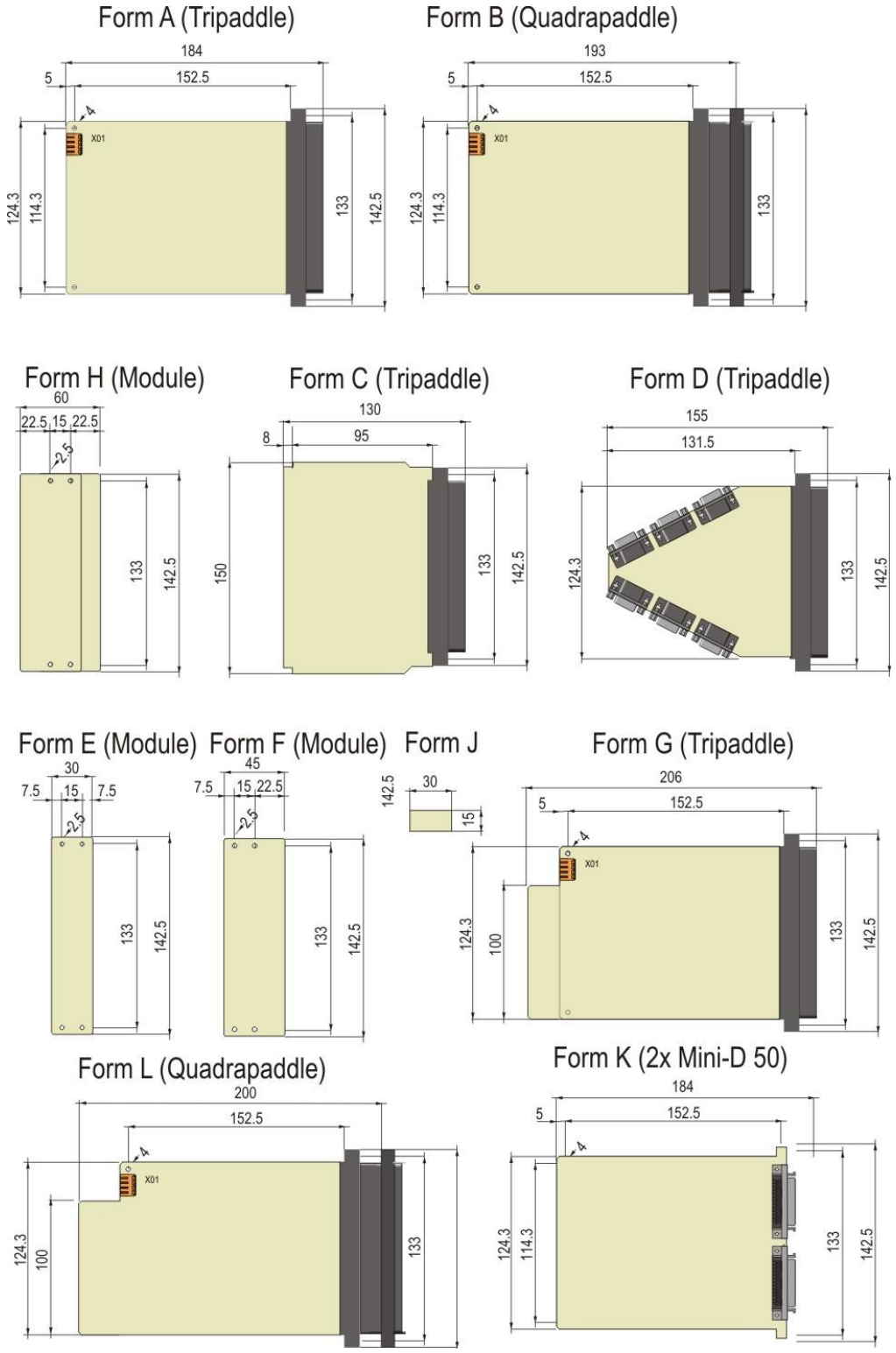


3.5.1 Connector X2

A	Description	B	Description	C	Description	D	Description
1	K001	1	K017	1	K033	1	
2	K049	2	K065	2	K081	2	Common 01
3	K097	3	K113	3	K129	3	K145
4	K002	4	K018	4	K034	4	Common 02
5	K050	5	K066	5	K082	5	Common 03
6	K098	6	K114	6	K130	6	K146
7	K003	7	K019	7	K035	7	Common 04
8	K051	8	K067	8	K083	8	Common 05
9	K099	9	K115	9	K131	9	K147
10	K004	10	K020	10	K036	10	Common 01
11	K052	11	K068	11	K084	11	Common 01
12	K100	12	K116	12	K132	12	K148
13	K005	13	K021	13	K037	13	Common 02
14	K053	14	K069	14	K085	14	Common 02
15	K101	15	K117	15	K133	15	K149
16	K006	16	K022	16	K038	16	Common 03
17	K054	17	K070	17	K086	17	Common 03
18	K102	18	K118	18	K134	18	K150
19	K007	19	K023	19	K039	19	Common 04
20	K055	20	K071	20	K087	20	Common 04
21	K103	21	K119	21	K135	21	K151
22	K008	22	K024	22	K040	22	Common 05
23	K056	23	K072	23	K088	23	Common 05
24	K104	24	K120	24	K136	24	K152
25	K009	25	K025	25	K041	25	Common 06
26	K057	26	K073	26	K089	26	Common 06
27	K105	27	K121	27	K137	27	K153
28	K010	28	K026	28	K042	28	Common 07
29	K058	29	K074	29	K090	29	Common 07
30	K106	30	K122	30	K138	30	K154
31	K011	31	K027	31	K043	31	Common 08
32	K059	32	K075	32	K091	32	Common 08
33	K107	33	K123	33	K139	33	K155
34	K012	34	K028	34	K044	34	Common 09
35	K060	35	K076	35	K092	35	Common 09
36	K108	36	K124	36	K140	36	K156
37	K013	37	K029	37	K045	37	Common 10
38	K061	38	K077	38	K093	38	Common 10
39	K109	39	K125	39	K141	39	K157
40	K014	40	K030	40	K046	40	Common 06
41	K062	41	K078	41	K094	41	Common 07
42	K110	42	K126	42	K142	42	K158
43	K015	43	K031	43	K047	43	Common 08
44	K063	44	K079	44	K095	44	Common 09
45	K111	45	K127	45	K143	45	K159
46	K016	46	K032	46	K048	46	Common 10
47	K064	47	K080	47	K096	47	
48	K112	48	K128	48	K144	48	K160

3.6 YAV boards Dimensions

YAV90057 is Form L



4. Low level CAN commands

Following, details on all CAN messages available to manage the YAV90057 module

YAV90MUX

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	0x155115xx	4	0x15	0x01	Relay	0x00				
Set ON One Relay	Rx	0x155115xx	4	0x15	0x01	Relay	0x01				
TOGGLE One Relay	Rx	0x155115xx	4	0x15	0x01	Relay	0x02				
BLINK One Relay	Rx	0x155115xx	4	0x15	0x01	Relay	0x03				
Set OFF Several Relays Block 0	Rx	0x155115xx	8	0x15	0x03	Relays 0..7	Relays 8..15	Relays 16..23	Relays 24..31	0x00	0x00
Set OFF Several Relays Block 1	Rx	0x155115xx	8	0x15	0x03	Relays 32..39	Relays 40..47	Relays 48..55	Relays 56..63	0x00	0x01
Set OFF Several Relays Block 2	Rx	0x155115xx	8	0x15	0x03	Relays 64..71	Relays 72..79	Relays 80..87	Relays 88..95	0x00	0x02
Set OFF Several Relays Block 3	Rx	0x155115xx	8	0x15	0x03	Relays 96..103	Relays 104..111	Relays 112..119	Relays 120..127	0x00	0x03
Set OFF Several Relays Block 4	Rx	0x155115xx	8	0x15	0x03	Relays 128..135	Relays 136..143	Relays 144..151	Relays 152..159	0x00	0x04
Set ON Several Relays Block 0	Rx	0x155115xx	8	0x15	0x03	Relays 0..7	Relays 8..15	Relays 16..23	Relays 24..31	0x01	0x00
Set ON Several Relays Block 1	Rx	0x155115xx	8	0x15	0x03	Relays 32..39	Relays 40..47	Relays 48..55	Relays 56..63	0x01	0x01
Set ON Several Relays Block 2	Rx	0x155115xx	8	0x15	0x03	Relays 64..71	Relays 72..79	Relays 80..87	Relays 88..95	0x01	0x02
Set ON Several Relays Block 3	Rx	0x155115xx	8	0x15	0x03	Relays 96..103	Relays 104..111	Relays 112..119	Relays 120..127	0x01	0x03
Set ON Several Relays Block 4	Rx	0x155115xx	8	0x15	0x03	Relays 128..135	Relays 136..143	Relays 144..151	Relays 152..159	0x01	0x04
TOGGLE Several Relays Block 0	Rx	0x155115xx	8	0x15	0x03	Relays 0..7	Relays 8..15	Relays 16..23	Relays 24..31	0x02	0x00
TOGGLE Several Relays Block 1	Rx	0x155115xx	8	0x15	0x03	Relays 32..39	Relays 40..47	Relays 48..55	Relays 56..63	0x02	0x01
TOGGLE Several Relays Block 2	Rx	0x155115xx	8	0x15	0x03	Relays 64..71	Relays 72..79	Relays 80..87	Relays 88..95	0x02	0x02
TOGGLE Several Relays Block 3	Rx	0x155115xx	8	0x15	0x03	Relays 96..103	Relays 104..111	Relays 112..119	Relays 120..127	0x02	0x03
TOGGLE Several Relays Block 4	Rx	0x155115xx	8	0x15	0x03	Relays 128..135	Relays 136..143	Relays 144..151	Relays 152..159	0x02	0x04
BLINK Several Relays Block 0	Rx	0x155115xx	8	0x15	0x03	Relays 0..7	Relays 8..15	Relays 16..23	Relays 24..31	0x03	0x00
BLINK Several Relays Block 1	Rx	0x155115xx	8	0x15	0x03	Relays 32..39	Relays 40..47	Relays 48..55	Relays 56..63	0x03	0x01
BLINK Several Relays Block 2	Rx	0x155115xx	8	0x15	0x03	Relays 64..71	Relays 72..79	Relays 80..87	Relays 88..95	0x03	0x02
BLINK Several Relays Block 3	Rx	0x155115xx	8	0x15	0x03	Relays 96..103	Relays 104..111	Relays 112..119	Relays 120..127	0x03	0x03
BLINK Several Relays Block 4	Rx	0x155115xx	8	0x15	0x03	Relays 128..135	Relays 136..143	Relays 144..151	Relays 152..159	0x03	0x04
Set OUT All Relays Block 0	Rx	0x155115xx	8	0x15	0x03	Relays 0..7	Relays 8..15	Relays 16..23	Relays 24..31	0x06	0x00
Set OUT All Relays Block 1	Rx	0x155115xx	8	0x15	0x03	Relays 32..39	Relays 40..47	Relays 48..55	Relays 56..63	0x06	0x01
Set OUT All Relays Block 2	Rx	0x155115xx	8	0x15	0x03	Relays 64..71	Relays 72..79	Relays 80..87	Relays 88..95	0x06	0x02
Set OUT All Relays Block 3	Rx	0x155115xx	8	0x15	0x03	Relays 96..103	Relays 104..111	Relays 112..119	Relays 120..127	0x06	0x03
Set OUT All Relays Block 4	Rx	0x155115xx	8	0x15	0x03	Relays 128..135	Relays 136..143	Relays 144..151	Relays 152..159	0x06	0x04
ASK ALL Relays	Rx	0x155115xx	3	0x15	0x04	Autosend					
All Relays Status Block 0	Tx	0x155215xx	7	0x15	0x04	Relays 0..7	Relays 8..15	Relays 16..23	Relays 24..31	0x00	
All Relays Status Block 1	Tx	0x155215xx	7	0x15	0x04	Relays 32..39	Relays 40..47	Relays 48..55	Relays 56..63	0x01	
All Relays Status Block 2	Tx	0x155215xx	7	0x15	0x04	Relays 64..71	Relays 72..79	Relays 80..87	Relays 88..95	0x02	
All Relays Status Block 3	Tx	0x155215xx	7	0x15	0x04	Relays 96..103	Relays 104..111	Relays 112..119	Relays 120..127	0x03	
All Relays Status Block 4	Tx	0x155215xx	7	0x15	0x04	Relays 128..135	Relays 136..143	Relays 144..151	Relays 152..159	0x04	

4.1 Example: Managing a YAV board using C language

Following example is showing how to manage a YAV board by using NI-CAN interface and C language.

We strongly recommend the software engineer to read NI-CAN manual for clear understanding on how to implement the communication with YAV boards (http://www.ni.com/pdf/manuals/370289k.pdf)

The YAV board used for this example is YAV904X8.

```
/*********************************************************
Example showing how to command the YAV904X8 board from a PC,
using a National Instruments NICAN interface board.

To be compiled with MS Visual C as a console application.
*********************************************************/
```

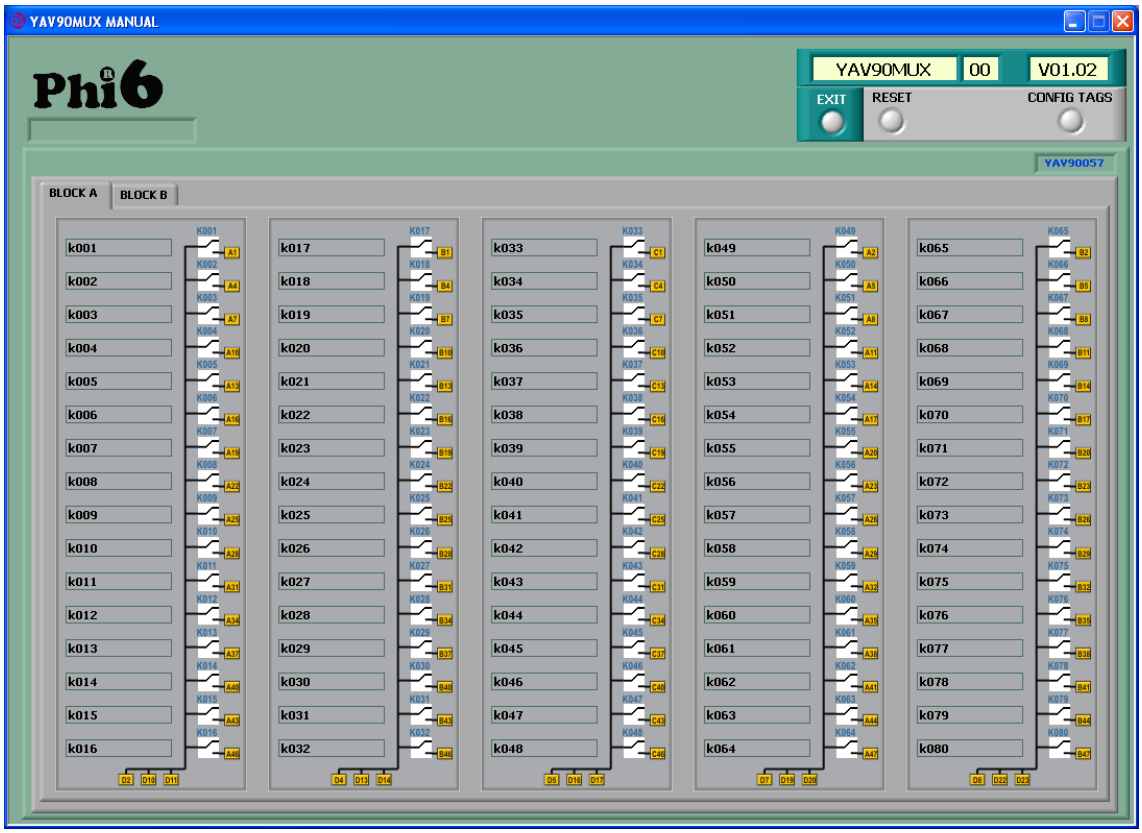
```
#include <stdio.h>      // Include file for printf
#include <stdlib.h>     // Include file for strtol
#include <windows.h>    // Include file for Win32 time functions
#include <conio.h>      // Include file for _getch/_kbhit
#include <string.h>
#include "Nican.h"      // Include file for NI-CAN functions and constants

/* NI-CAN handle */
NCTYPE_OBJH TxHandle=0;

/* Print a description of an NI-CAN error/warning. */
void PrintStat(NCTYPE_STATUS status, char *source)
{
    char statusString[1024];

    if (status != 0)
    {
        ncStatusToString(status, sizeof(statusString), statusString);
        printf("\n%s\nSource = %s\n", statusString, source);

        // close object handle, then exit.
        ncCloseObject(TxHandle);
        exit(1);
    }
}

int main ()
{

    NCTYPE_STATUS       Status;
    NCTYPE_CAN_FRAME    Transmit;
    NCTYPE_ATTRID       AttrIdList[8];
    NCTYPE_UINT32       AttrValueList[8];
    NCTYPE_UINT32       Baudrate = 50000;
    char                Interface[7] = "CAN0";
    int                 ch;

    /* Configure the CAN Network Interface Object */
    AttrIdList[0] =    NC_ATTR_BAUD_RATE;
    AttrValueList[0] = Baudrate;
    AttrIdList[1] =    NC_ATTR_START_ON_OPEN;
    AttrValueList[1] = NC_TRUE;
    AttrIdList[2] =    NC_ATTR_READ_Q_LEN;
    AttrValueList[2] = 0;
    AttrIdList[3] =    NC_ATTR_WRITE_Q_LEN;
    AttrValueList[3] = 1;
    AttrIdList[4] =    NC_ATTR_CAN_COMP_STD;
    AttrValueList[4] = 0;
    AttrIdList[5] =    NC_ATTR_CAN_MASK_STD;
    AttrValueList[5] = NC_CAN_MASK_STD_DONTCARE;
    AttrIdList[6] =    NC_ATTR_CAN_COMP_XTD;
    AttrValueList[6] = 0;
    AttrIdList[7] =    NC_ATTR_CAN_MASK_XTD;
    AttrValueList[7] = NC_CAN_MASK_XTD_DONTCARE;

    Status = ncConfig(Interface, 8, AttrIdList, AttrValueList);
    if (Status < 0)
    {
        PrintStat(Status, "ncConfig");
    }

    /* open the CAN Network Interface Object */
    Status = ncOpenObject(Interface, &TxHandle);
    if (Status < 0)
    {
        PrintStat(Status, "ncOpenObject");
    }


    /* print the Help to the I/O window */
    printf("\n\ninitialized successfuly on CAN0 ...\n\nPress 't' to transmit a frame \n\nPress 'q' to quit
\n\n");

    /* Pulse YAV904X8 relay 1 second, each time the user is pressing a key */
    do
```

```
    {
        ch = _getch();

        if (ch == 't')
        {
            Transmit.Data[0]        = 0x02;         // YAV command prefix
            Transmit.Data[1]        = 0x01;         // YAV command prefix
            Transmit.Data[2]        = 0x00;         // relay number
            Transmit.Data[3]        = 0x01;         // YAV set relay ON command
            Transmit.DataLength     = 4;            // Set CAN frame lenght
            Transmit.IsRemote       = 0;            // This is not a remote frame
            Transmit.ArbitrationId  = 0x15510200;   // assume board address is 0
            Transmit.ArbitrationId |= 0x20000000;   // NICAN specific, set 29 bit id length

            Status= ncWrite(TxHandle, sizeof(Transmit), &Transmit);
            if (Status < 0)
            {
                PrintStat(Status, "ncWrite");
            }

            Sleep(1000);

            Transmit.Data[0]        = 0x02;         // YAV command prefix
            Transmit.Data[1]        = 0x01;         // YAV command prefix
            Transmit.Data[2]        = 0x00;         // relay number
            Transmit.Data[3]        = 0x00;         // YAV set relay OFF command
            Transmit.DataLength     = 4;            // Set CAN frame lenght
            Transmit.IsRemote       = 0;            // This is not a remote frame
            Transmit.ArbitrationId  = 0x15510200;   // assume board address is 0
            Transmit.ArbitrationId |= 0x20000000;   // NICAN specific, set 29 bit id length

            Status= ncWrite(TxHandle, sizeof(Transmit), &Transmit);
            if (Status < 0)
            {
                PrintStat(Status, "ncWrite");
            }

            Sleep(1000);
        }
    } while (ch != 'q');

    /* Close the Network Interface Object */
    Status = ncCloseObject(TxHandle);
    if (Status < 0)
    {
        PrintStat(Status, "ncCloseObject");
    }

    return 0;
}
```

5. PHI6-Explorer panel

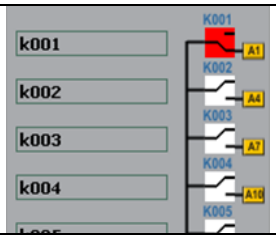
Thanks to the PHI6-EXPLORER panel, the operator can manage YAV90057 board manually. This is a very powerful tool for table-top debugging of test-systems or system maintenance on-site.

The interface is very user-friendly:



Activating a relays

By clicking a relays in the panel, the relays will close, and its status in the panel will change. See image, with K001 in 'closed' status.



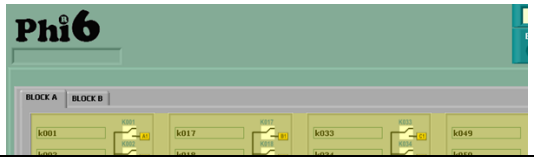
Reset

Reset button will put all relays in 'Open' status.

Config tags

We can give the name desired to each relays in the board with this function. By clicking this button, the panel will change its background color from grey to yellow, and we will be able to change tags.

In the image left hand, the user is changing the tag of the module. Now, for the environment, the board will be called 'Switch boards'.



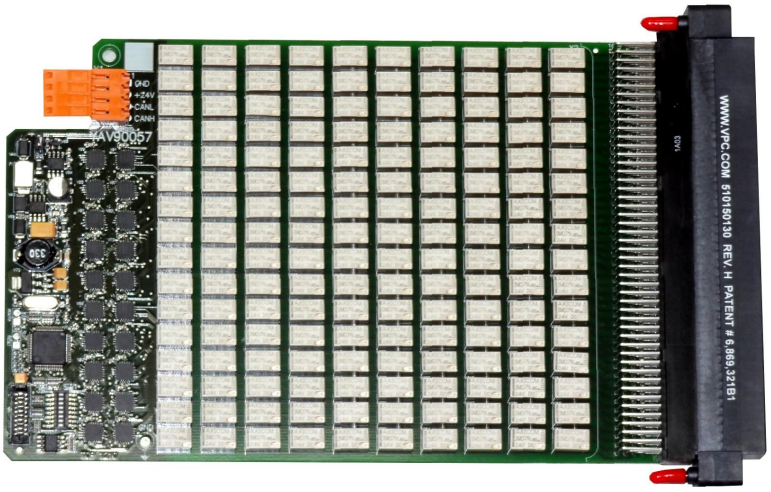
The name of K1 and K2 has also been changed, because in his design, the user will connect pins 3 and 4 to a load that is shared by different DUTs.
When pushing 'save tags' green button, changes will be set and the background will be grey again.

Exit
Click this button to exit the phi6 panel.

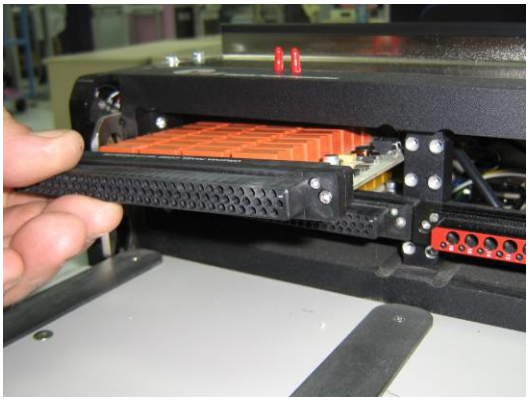
6. Install/Uninstall YAV boards into/from a VPC Receiver

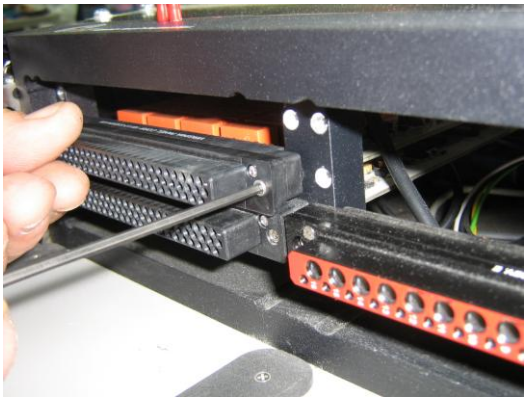
6.1 Modules in receiver side

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 coming 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.





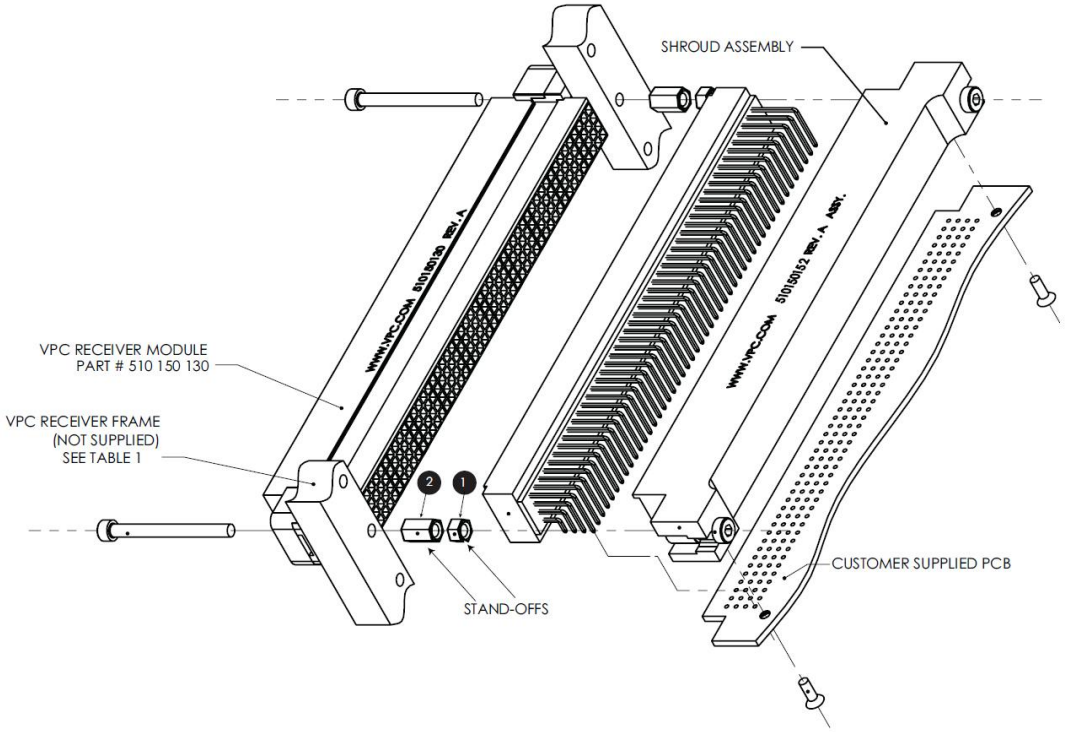
For removing the boards, unscrew and hold the board with two hands from both sides and pull straight out.

6.1.1 Interfaces w/Quadrapaddle

Some PCB Interfaces come with 192 pin connector P/N 510150152 from VPC (high density connector). As this connector is a male, it will be necessary to place an additional connector into the receiver, prior to connecting the YAV board.

Following image (source VPC) can be used to explain the procedure for mounting the PCB Interfaces.

Using the supplied 3/32 Allen wrench, install the receiver module into the receiver frame with the two 4-40 x 1¼ screws. Torque screws to 4 in-lbs [0.45 Nm]. Note that screw will extend approximately 0.75”-1.0” [19-25 mm] beyond the rear of the receiver frame.



Access the rear of the receiver frame and install the 4-40 stand-offs to the 4-40 X 1¼” module retaining screws. For G12 or 9025 receivers, use item 1 as stand-off (⅛" [3.18 mm] stand-off per mounting screw).

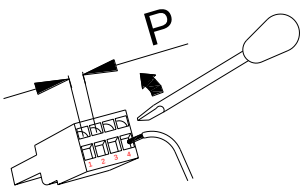
Using the 3/32 Allen wrench, carefully install the YAV board by tightening the retaining sockets, turning each no more than 1½ to 2 full revolutions before alternating to the other socket. Repeat this step until the YAV board is firmly engaged with the receiver module, taking care not to over-tighten. Torque screws to 4 in-lbs [0.45 Nm].

To remove the YAV board from the receiver frame and module, use the same alternating method of 1½ to 2 turns until YAV board is fully disengaged.

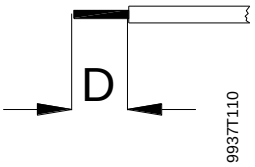
6.2 Connections

6.2.1 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 into X1 of the YAV board.



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



7. Getting started with your YAV board

7.1 NI CAN board

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

7.2 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 together in no galvanic isolation in the YAV.

7.3 PHI6-EXPLORER

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

8. YAV boards overview

The use of YAV boards and modules provide a real technical, economical and logistic advantage against all other classic instrumentation solutions. YAV Boards are the solution for typical practical problems that occur while designing test platforms. They provide a considerably test system performance increase. The minimal amount of connections and wiring length reduction maintain the best quality and integrity of the signals and provide a short assembly and wiring time.

Being a combination of hardware modules and software drivers, the implementation of the YAV boards in your test system is very fast. When connected, the YAV boards are immediately operative. YAV Boards make your test system very flexible, re-configurable, easy to expand and maintain. Each board can work independently form the tester so you can just plug each of them directly into the ITA of a fixture to start debugging the software without the need of using the test platform. While the tester is being used to test electronics you have the advantage to debug or build any new configuration in a few minutes.

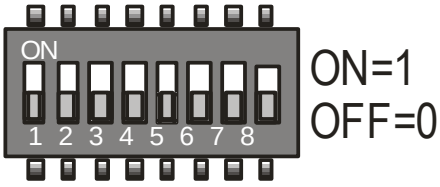
Can bus control has a big advantage; it provides all the control and power supply signals to power the YAV Boards in just 4 wires. Therefore the modules can be mounted in any part of the test system or test fixture. The Can bus transmission speed might be lower than the one available in parallel busses, but it is at least 100 times faster than the speed needed to control all the available functions in each of our YAV modules.

8.1 YAV boards common information

8.1.1 SW1 DIP switch functionality

The eight switches contained in SW1 have the following functionality

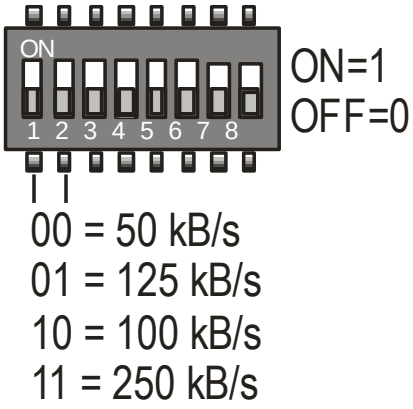
- Set CAN bus speed
- Set board address



8.1.2 CAN bus communication speed

Switches 1 and 2 set the CAN communication speed:

Select 50Kb/s to communicate with Phi6 and 6TL products. All devices communicating through the CAN network must have the same speed configured in order to communicate properly.

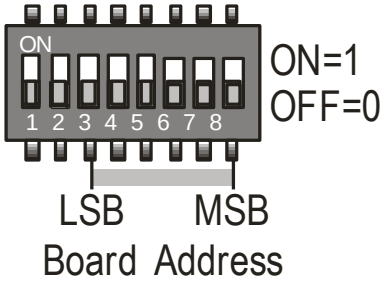


8.1.3 YAV board address

The logic address is composed by 2 elements: the module identifier and the hardware address.

The hardware address is selected by switches 3 to 8 of SW1, being 3 the least significant bit (LSB). The module identifier is contained in the board firmware and cannot be changed. There is a different identifier for each YAV board type. Therefore, boards of different module identifier can have the same hardware address.

Since there are 6 bits there are up to 64 possible addresses (from 0 to 63).



8.2 YAV boards standard addressing

Although the user can set any address for his modules, 6TL defines standard addressing for the modules that are installed by default in 6TL testing platforms.

The motivation is to ease compatibility between platforms and systems and 6TL strongly recommend following this standard in order to facilitate platforms setup and maintenance.

The following table shows the standard addressing for the YAV boards and modules installed in the different slots of the Virginia Panel receivers:

SW1 Address (Binary code) MSB LSB	Phi6 Address	Skeeter S6	Gemini 10	Gemini 12	Gemini 12X	Gemini 25	Gemini 50
00 0001	**1**	A1	1	A1	A1	1	1 UP
00 0010	**2**	A2	2	A2	A2	2	2 UP
00 0011	**3**	B1	3	A3	A3	3	3 UP
00 0100	**4**	B2	4	A4	A4	4	4 UP
00 0101	**5**	C1	5	B1	B1	5	5 UP
00 0110	**6**	C2	6	B2	B2	6	6 UP
00 0111	**7**		7	B3	B3	7	7 UP
00 1000	**8**		8	B4	B4	8	8 UP
00 1001	**9**		9	C1	C1	9	9 UP
00 1010	**10**		10	C2	C2	10	10 UP
00 1011	**11**			C3	C3	11	11 UP
00 1100	**12**			C4	C4	12	12 UP
00 1101	**13**				A5	13	13 UP
00 1110	**14**				A6	14	14 UP
00 1111	**15**				B5	15	15 UP
01 0000	**16**				B6	16	16 UP
01 0001	**17**				C5	17	17 UP
01 0010	**18**				C6	18	18 UP
01 0011	**19**					19	19 UP
01 0100	**20**					20	20 UP
01 0101	**21**					21	21 UP
01 0110	**22**					22	22 UP
01 0111	**23**					23	23 UP
01 1000	**24**					24	24 UP
01 1001	**25**					25	25 UP
01 1010	**26**						1 DOWN
01 1011	**27**						2 DOWN
01 1100	**28**						3 DOWN
01 1101	**29**						4 DOWN
01 1110	**30**						5 DOWN
01 1111	**31**						6 DOWN
10 0000	**32**						7 DOWN
10 0001	**33**						8 DOWN
10 0010	**34**						9 DOWN
10 0011	**35**						10 DOWN
10 0100	**36**						11 DOWN
10 0101	**37**						12 DOWN
10 0110	**38**						13 DOWN
10 0111	**39**						14 DOWN
10 1000	**40**						15 DOWN
10 1001	**41**						16 DOWN
10 1010	**42**						17 DOWN
10 1011	**43**						18 DOWN
10 1100	**44**						19 DOWN
10 1101	**45**						20 DOWN
10 1110	**46**						21 DOWN
10 1111	**47**						22 DOWN
11 0000	**48**						23 DOWN
11 0001	**49**						24 DOWN
11 0010	**50**						25 DOWN

Next table shows the list of YAV boards that are installed in each of the 6TL platforms. Note that the “Platform” column indicates whether the board is actually installed in the platform or not:

YAV Module Identificator	Phi6 Address	SW1 Address (Bin Code) MSB…..LSB	YAV Board	Firmware Name	Function (Board Alias)	Platform TTT-1	Platform 6TL-22	Platform 6TL-32	Module P/N
YAV90304	0	00 0000	MW0304	YAV-90304	6TL_Platform_Status	X	X		8TTT2BOX
YAV90304	63	11 1111	H5400 0100	MMI5400	6TL_MMI		X	X	H7300 03 XX
YAV90304	62	11 1110	YAV90304	YAV-90304	6TL_Beacon	-/X	-/X	-/X	H7800 10 XX
YAV90304	61	11 1101	MW0304	YAV-90304	6TL_Rejection_Channel	-/X	-/X		H7300 06 00
YAV90304	60	11 1100	87100600	R300K	6TL_Conveyor_Control			X	H710061
YAV90304	59	11 1011	8710061E02	R300K	6TL_Feed_Control			-/X	H710061
YAV90304	58	11 1010	8710061E02	R300K	6TL_Outp_Control			-/X	H710061
YAV90304	57	11 1001	YAV90304	YAV-90304	6TL_Apil_Control			-/X	H7800 10 XX
YAV90304	56		YAV90304	YAV-90304	6TL_Power_Triphasic				
YAV90304	55		YAV90304	YAV-90304	6TL_Power_Rack				
YAV90304	54		YAV90304	YAV-90304	6TL_Soft_Start				
YAV90304	53		YAV90304	YAV-90304	6TL_CAN_Power				
YAV90304	52		YAV90304	YAV-90304	6TL_PDU2				
YAV90304	51		YAV90304	YAV-90304	6TL_PDU1				
YAV90304	50		YAV90304	YAV-90304	6TL_RF_pusher				
H710061	0	00 0000	8710061E02	H7100-61	6TL_Conveyor_Belt			X	H710061
H710061	1	00 0001	8710061E02	H7100-61	6TL_Conveyor_Wide			X	H710061
H710061	2	00 0010	8710061E02	H7100-61	6TL_Feed_Belt			-/X	H710061
H710061	3	00 0011	8710061E02	H7100-61	6TL_Feed_Wide			-/X	H710061
H710061	4	00 0100	8710061E02	H7100-61	6TL_Outp_Belt			-/X	H710061
H710061	5	00 0101	8710061E02	H7100-61	6TL_Outp_Wide			-/X	H710061
H710061	6	00 0110	8710061E02	H7100-61(V02.xx)	6TL_Apil_Belt			-/X	H710061
H710061	7	00 0111	8710061E02	H7100-61(V02.xx)	6TL_Apil_Wide			-/X	H710061
H710061	8			H7100-61	6TL_Base_Lifter				H710061
H710060	0	00 0000	87100600	H7100-60	6TL_Pusher		-/X	X	H710060
H710060	1	00 0001	87100600	H7100-60	6TL_Lifter			X	H710060
H710060	7	00 0111	87100600	H7100-60	6TL_Selector			-/X	H710060
YAVCANCON	0	00 0000	YAVCANCON	YAV-CANCON	6TL_Fixture_ID_Master	X	X	X	YAVCANCON
YAVCANCON	1	00 0001	YAVCANCON	YAV-CANCON	6TL_Fixture_ID_Slave		-/X	X	YAVCANCON
MMI	0	00 0000	MMI	MMI	6TL_MMI		X	X	H7300 0700
YAV90PNE*	25	01 1001	YAV90PNE	YAV-90PNE	6TL_Pneumatic			X	YAV90PNE

* Installed in

First (YAV Module identifier) and second (Phi6 Address) columns are composing the address of the module when it is part of a 6TL testing platform.

There are some modules that do not feature SW1, therefore, user can not change the address. This modules are YAVCANCON’s and the MMI, P/N H730003xx, and their address is programmed in the factory with the address shown in the table.

Fourth column (YAV board) refers to 6TL’s internal code for the PCB HW used by the module.

Fifth column (Firmware name) is referring to 6TL’s internal name given to the firmware running in the PCB HW of the module.

Sixth column (Function; Board Alias) refers to the default (and standard 6TL) name given by Phi6 to each board, depending on his function in the 6TL platform. These alias could be changed through Phi6 Explorer, edit Tags.

Seventh column (Platform) is informing about what platform uses what modules. A cross [X] is indicating that the module is always installed as standard delivery. A cross with bar [-/X] is indicating that that module is a potential option for that platform.

Eighth column (Module P/N) is showing the module commercial P/N of the module (Typically 8 or 9 digit number. If less numbers in the table, complete with 0's).

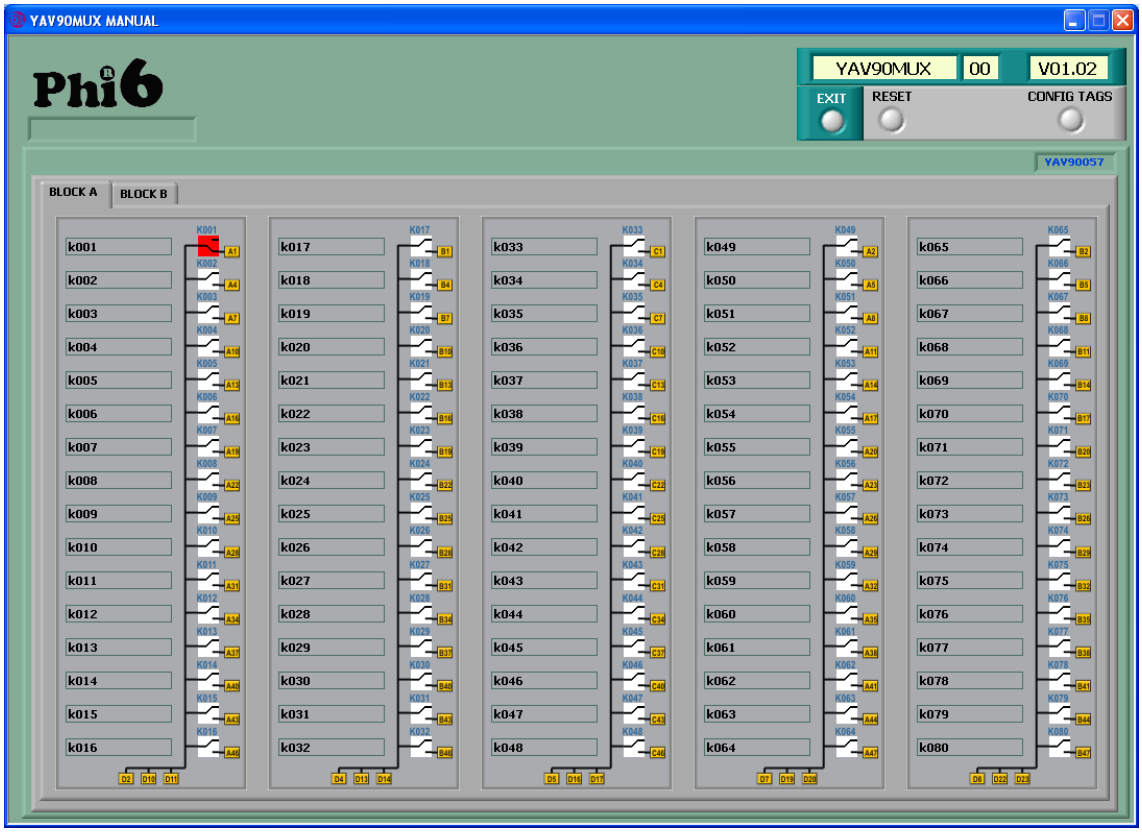
9. Operation

9.1 Outputs Activation

The outputs state can be writing with the CAN bus LAN, with instructions and addresses specified on the Phi6 Commands chapter. Outputs activation through CAN bus can be synchronized using the trigger input command after setting the wanted values.

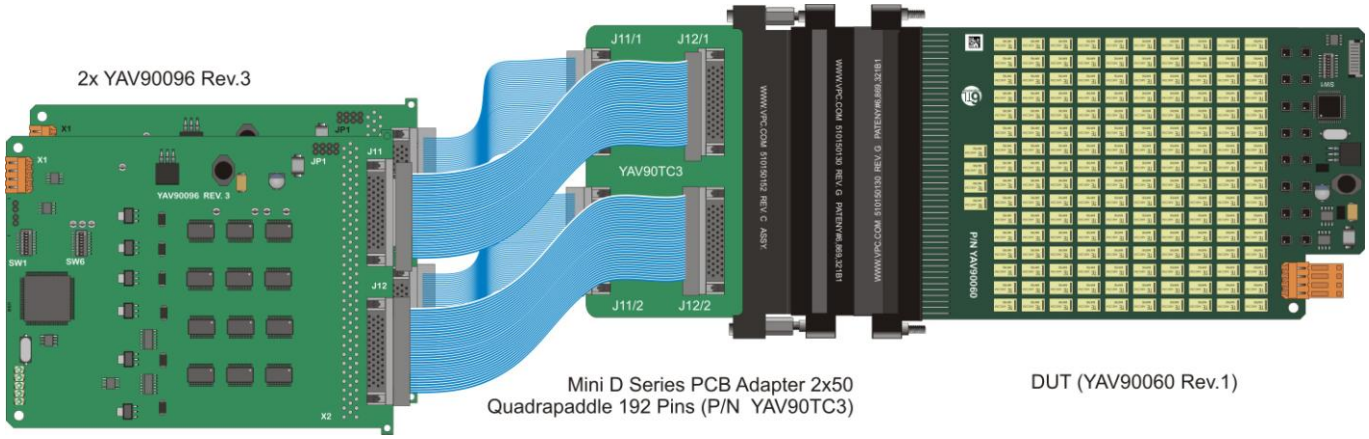
9.2 Soft Panel

Active Outputs: Red Backlight



10. Test

The YAV90057 board will be tested using the set of two boards YAV90096I capabilities for Sink/Source current and its direct connection pin-to-pin.



The following diagram shows the connections for two sections. The board YAV90096I will be set with all the pins sourcing 16 mA from +20V (V_{PWR}) and all comparator outputs must maintain high level. Sequentially the DUT outputs will be activated and the corresponding comparator Bit have to change to logic low, while all others remaining in high.

The first phase in test operation will be firmware uploading via JTAG port.

The test report will content the S/N, date of test and result of all test steps.

10.1 Test Report model

s.a.Sistel	TEST REPORT	P/N	YAV90321
		S/N	388.211
		Date	20/11/2011
		Operator	MRR

Test Conditions

Envoirement Conditions	24°C 85% RH
Power Supply	24,05 VDC
Test voltage	8 VDC
Test current	16 mA
Effective voltage in the inputs	6 VDC
Test Executive Software	620019 VER 00

Test Results

Ch.		Ch.		CH.		CH.	
1	OK	13	OK	25	OK	37	OK
2	OK	14	OK	26	OK	38	OK
3	OK	15	OK	27	OK	39	OK
4	OK	16	OK	28	OK	40	OK
5	OK	17	OK	29	OK	41	OK
6	OK	18	OK	30	OK	42	OK
7	OK	19	OK	31	OK	43	OK
8	OK	20	OK	32	OK	44	OK
9	OK	21	OK	33	OK	45	OK
10	OK	22	OK	34	OK	46	OK
11	OK	23	OK	35	OK	47	OK
12	OK	24	OK	36	OK	48	OK

Signature

11. F.A.Q.s

Is it mandatory the flying diode for inductive loads?	In order to prevent overvoltage in the inductive loads disconnection, a suitable flying diode close to the coil terminals is recommended.
With is the maximum current per output pin?	Electrically is 2 A due to relay and PCB tracks
With is the maximum current per bank?	The maximum continuous current per bank is limited for the common pins contacts to 10A.