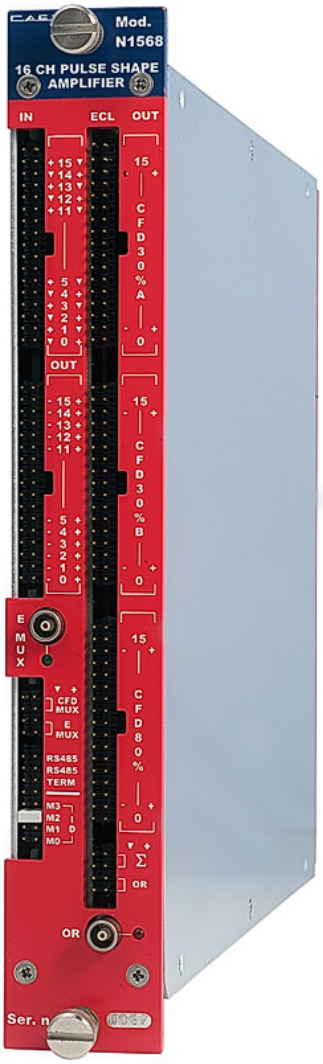
Rev. 0 - 27/03/2009

N1568A

16 Ch Programmable Spectroscopy Amplifier and Dual 16 Ch CFD (30% and 80%)



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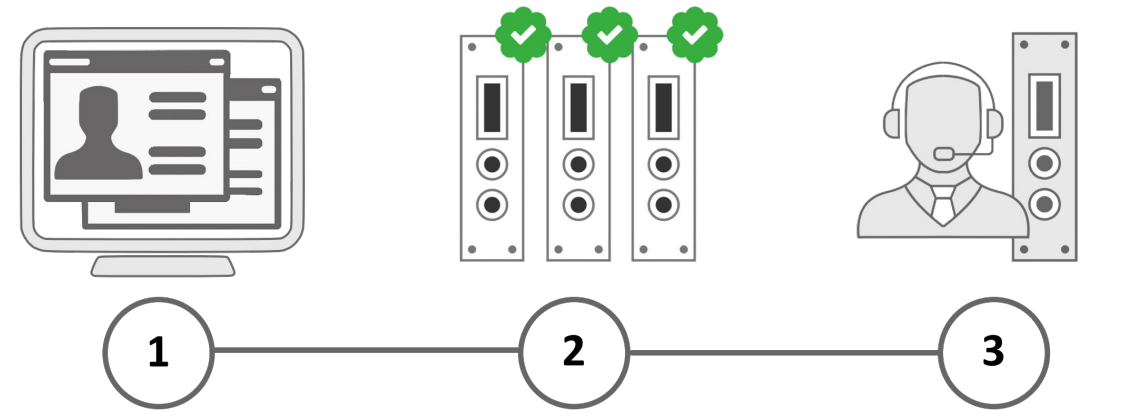

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Technical Information Manual

Revision n. 0
27 March 2009

MOD. N1568A

16CH SPECTROSCOPY AMPLIFIER & DISCRIMINATOR

NPO:
00115/06:1568A.MUTx/00

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1. General description

1.1 Overview

The Mod. N1568A is a 16 Channel Spectroscopy Amplifier and 16 Channel Double Constant Fraction Discriminator (30% and 80% constant fraction) implemented in a single-width NIM module.
This module is designed to be used with silicon detectors connected to charge preamplifiers, where the measure of charges collection time allows to obtain the identification in Z of the particles caught by the detector. The rise time is measured via two constant fraction discriminators (30% and 80% of rise time respectively).
Each channel is composed by two sections: Energy section (A) and Timing section (B). The input signal is sent to both sections simultaneously. Section A processes the input signal with a differential circuit, followed by the gain stages (coarse: 2 bit; fine: 8 bit; total range: 0.8 ÷ 182), and finally by the shaping.
Section B processes the signal with a low noise differential stage (1000 ns differential, 10 ns integral) followed by a 2 bit programmable linear gain stage; the signal is then fed to two low walk and high resolution Constant Fraction Discriminator sections (30% and 80% constant fraction respectively).
The discriminators share a 8 bit common threshold; the 30% CF discriminators delay is adjustable via PCB jumpers (6 steps from 15 to 150 ns); the 80% CF discriminators delay is 100 ns.
The RS485 interface allows to handle most functional parameters such as Shaping Time, Coarse and Fine Gain, Input Polarity, Output Polarity, CFD Thresholds, Pole Zero Adjustment etc.
All the programmable values are automatically stored in a non-volatile memory and at the power on, are reloaded.
All the inputs and the outputs of this module are accessible on the front panel.
The module can be easily programmed through a connection with a terminal emulator (such as Hyper Terminal); the module microcontroller handles a simple User interface; therefore a dedicated software is not necessary.
An optional USB-RS485 Adapter converts from USB to RS-422/485; the device is provided with drivers supporting the most used OS's (see also § 3.6.1).

1.1.1 Energy section

The input signal is fed into the inverting/non inverting input buffer stage (common with the Timing Section) followed by a differential circuit with pole-zero- adjustment, two gain stages, the shaping circuits, the DC restore; the correct operation of the input buffer stage requires the setting of the input polarity via terminal.
The shaping time can be selected by two bit in 4 different values between 0.5 µs and 4 µs.
The Pole-zero can be adjusted by 8 bits (50µs to 2ms).
The 2 bits of Coarse Gain and the 8 bits of the Fine Gain allow an accurate selection of the gain value.
The 16 Channel Outputs are provided to the (OUT) connector present on the Front Panel; Gaussian output is provided, polarity is selectable. The Outputs shall be fed to a peak sensing ADC.

A Multiplexer output allows monitoring the 16 channel Outputs. When a channel is selected by the user through the communication program of the module, the corresponding Output is automatically sent to the “E MUX” output connectors.
When the Module is selected via RS485, the Green LED lights “ON” and the E MUX Output is enabled.
The E MUX OUTPUT is present on both two pin double row connector and LEMO Connector.

1.1.2 Timing section

The Section processes the input signal, after the inv./noninv. Buffer Stage, with a differential circuit (1000 ns differential, 10 ns integral) followed by a 2 bit programmable linear gain stage (G = 1, 2, 4, 8) followed by two low walk and high resolution Constant Fraction Discriminator circuits having 30% and 80% fraction respectively.
The Constant Fraction Discrimination technique is based on summing a delayed, full height input signal to an inverted and attenuated signal. The resulting signal is fed into a zero-crossing comparator, thus obtaining a precise timing information that eliminates any walk errors induced by constant rise time and varying amplitude signals.
For correct operation the maximum of the attenuated pulse has to cross the delayed pulse at the selected fraction. This condition leads to the following relation:

$$T_{delay} = T_{rise} * (1 - F)$$

where:

T_{delay} = delay selected via one SMD zero Ohm resistance (see § 3.3)

T_{rise} = expected rise time of the input signals

F = Constant Fraction value (30% for the N1568A)

The delay value of the 30% CFD is adjustable via SMD zero Ohm resistance between 15 and 150ns in 6 steps (15, 22, 30, 37,100 and 150ns); it is necessary to select the delay value closest (yet smaller) to the expected rise time. § 3.3 shows the SMD zero Ohm resistance, while the 80% CFD is fixed at the max value of 100ns.
The 30% CFD delay value can be selected by the user depending on the rise time of the input signal so as to optimize the timing performance .
Both CFDs are enabled by a programmable threshold discriminator by 8 bit (700mV max).
The width of the CFD’s output signals is programmable in the range of 700ns up to 1µs by 8 bits (CFD 30%); CFD 80% width depends on CFD 30% width (it always ends at the same time of CFD 30%), for example it can assume 630ns up to 930ns by 8 bits.
The 16 Channel 30% CFD Outputs are present on the Front Panel with two Fan OUT connectors (A and B).
The 16 Channel 80% CFD Outputs are present on the Front Panel by one connector.
The 30% CFD OUTPUT signal is also used to generate:
- an analog multiplicity signal “Σ” with 1mA per hit, present on a two pin double row connector.
- an OR signal of the 16 channels, present on the two pin double row connector and on a LEMO connector.
A Red LED flashes when the OR signal is present.
A 30% CFD Multiplexed Output is present on the F.P by two pin double row connector (CFD MUX).
The 80% CFD OUTPUT width depends on two facts: the signal initial time is given by the input rise time, the ending time by the end of 30% CFD OUTPUT (see Fig. 1.2).

1.1.3 Interface capability

The module is programmable by means a RS485 serial interface on two pins double row connector (see also § 3.5).
Connection of up to 16 modules is possible and each module is programmed individually by means of a 4 bit address, selectable via 4 Jumpers located on the front panel.
The User can configure an electronic chain with up to 256 channels, and using the E and CFD MUX outputs can monitor the status of all the channels (16 channel x 16 modules = 256).

1.1.4 Purposes and performances

The performances of this module allow operation with semiconductor detectors in different applications.
The main purpose of N1568A module is the charge identification (ID) of nuclear particles which are stopped in a silicon detector. The ID method is based on an efficient pulse shape analysis of the rise time charge signal produced by the ionizing particle. The rise time measurement is performed by comparing two CFD logical signals. N1568A module incorporates the relevant measurements in nuclear spectroscopy, such as signal amplitude for the energy measurements (E) and timing reference for the Time of Flight (TOF) applications. The input signal, delivered by the output of a Charge Preamplifier, is treated by two separate sections. The first section is devoted to generate a proper shaped signal for the E information. The second section is devoted to generate two separate logical CFD signals (30% and 80% of the timing signal, respectively). So that carefully TOF measurements are also allowed by the module. In conclusion the N1568A module produces the relevant functions of a typical high resolution spectroscopic chain, needed for nuclear spectroscopy.
Characteristic parameters, such as CFD internal line delays and differentiation constants of the time signal, have been chosen and tuned in order to fit with high capacitance silicon detectors. These parameters can be changed according to the characteristics of the semiconductor devices, and on request by the users.

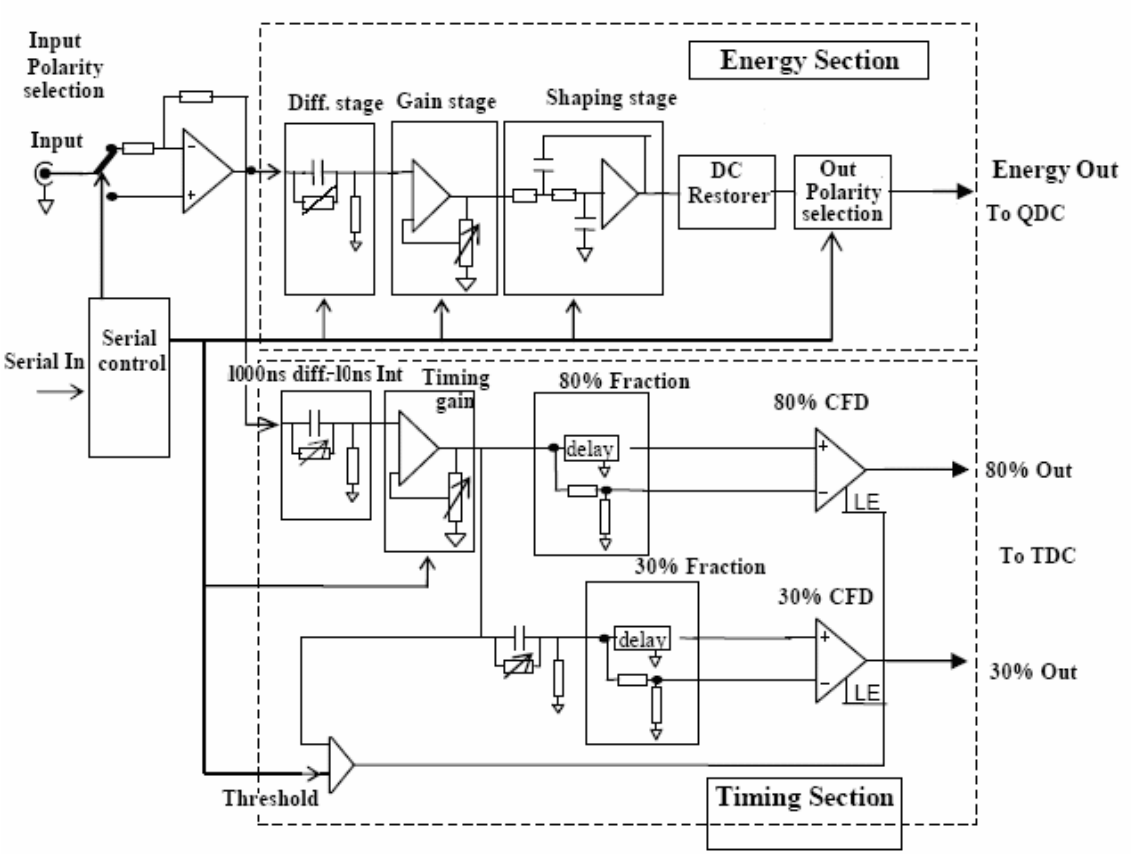

Fig. 1.1: Block diagram

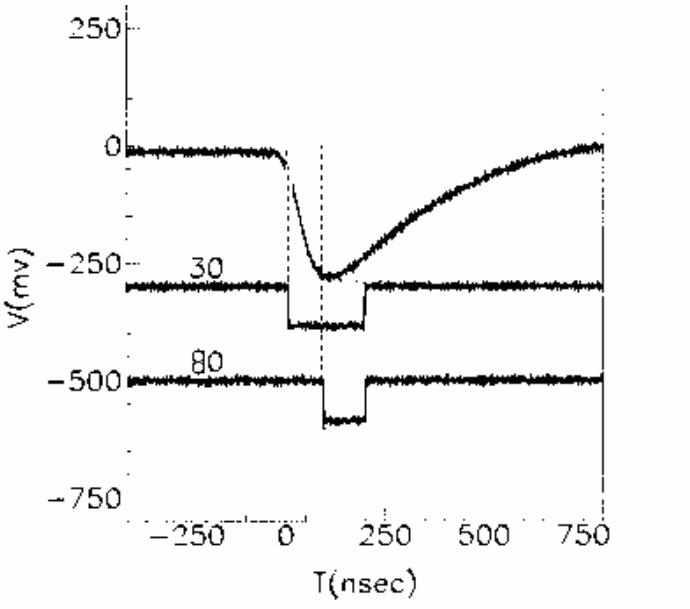

Fig. 1.2: Schematic view of basic method used to Measure rise time of the signal

As evident in the figure, the measure of the rise time is obtained between the time difference from 30% and 80%.

2. Technical specifications

2.1 Packaging

The Model N1568A is housed in a single width NIM module.

2.2 Power requirements

Table 2.1: Power requirements

+12 V	0.9 A
-12 V	0.8 A
+6 V	1.4 A
-6 V	4 A

2.3 Front panel

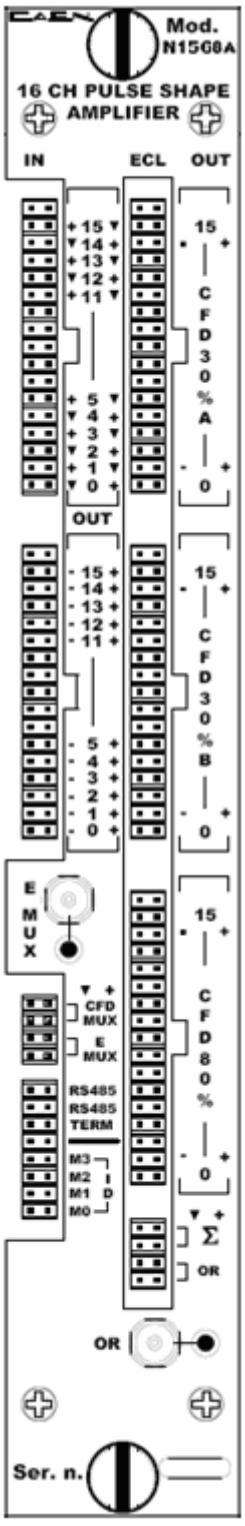

Fig. 2.1: Mod. N1568A Front panel

2.4 External components

2.4.1 Connectors

N. 16, "IN 0..15", input signal connector, 17 + 17 pin, double row strip header (left and right pin ground alternatively).

N. 16, "OUT 0..15", output Energy signal connector, 17 + 17 pin, double row strip header (left pin: ground, right pin: signal).

N. 16, "OUT CFD 30% 0..15", output 30% CFD connector "A", 17+17 pin, double row strip header (left pin: -ECL, right pin: +ECL);

N. 16, "OUT CFD 30% 0..15", output 30% CFD connector "B", 17+17 pin, double row strip header (left pin: -ECL, right pin: +ECL);

N. 16, "OUT CFD 80% 0..15", output 80% CFD connector, 17+17 pin, double row strip header (left pin: -ECL, right pin: +ECL);

N. 1, " E MUX", LEMO 00 type; single selected channel output connector.

N. 1, "E MUX", 2+2 pin, ; single selected channel output double row strip header (left pin: ground, right pin: signal).

N. 1, " CFD MUX 30%", 2+2 pin, ; single selected channel output double row strip header (left pin: ground, right pin: signal).

N. 1, "RS 485", 2+2 pin, double row strip header differential signal (left pin: -, right pin:+).

N. 1, "Σ", 2+2 pin, double row strip header (left pin: ground, right pin: signal).

N. 1, "OR", 2+2 pin, double row strip header (left pin: ground, right pin: signal).

N. 1, "OR", LEMO 00 type.

2.4.2 Jumpers and Leds

N. 1, "TERM", 1+1 pin, double row strip, RS 485 Line termination jumper (terminates line on 100 Ohm when inserted).

N. 1, "ID", 4+4 pin, double row strip header, Short Circuit Jumpers, for the selection of the module identification number (M0, M1, M2, M3 respectively).

N. 1, " E MUX", Green LED when the module is selected and E MUX out is active.

N. 1, " OUT OR", output signal OR, RED LED.

2.5 Characteristics of the signals

Table 2.2: I/O signals

INPUT	Positive or negative pulses, max. amplitude of ±4V, 50 Ohm impedance Input polarity must be set via terminal
E OUT	Unipolar/gaussian signal with a dynamic range of 0 ÷ ± 8V max (on 1MOhm), 50Ohm output impedance; polarity must be set via terminal
OUT CFD 30%	A and B connectors, ECL output; width 700÷1000 ns

OUT CFD 80%	ECL output
E MUX	on LEMO connector, 0 ÷ ±5V max (on 1MOhm), 50 ohm impedance; high impedance when disabled. On double row connector, 0 ÷ ±5V max (on 1MOhm), 50 ohm impedance, high impedance when disabled, same polarity as E OUT, amplitude: 0.625x E OUT(on 1MOhm)
CFD MUX 30%	- 4mA current output (-200 mV on 50Ohm)
"Σ"	Sum of OUT CFD 30%; - 1mA current output per hit, 50mV on 50Ohm
"OR"	OR of OUT CFD 30%'s on LEMO connector, standard NIM output -16mA current output on double row connector, -16mA current output

2.6 Serial Interface

RS 485 Serial Port Interface allows to control up to 16 modules connected by a twisted pair cable; the last module must be terminated by a Jumper (TERM) located on the Front Panel.

2.7 Technical features

Table 2.3: Mod. N1568A Technical Features

INTEGRAL NON LINEARITY	±0.05% in 20÷90% of the full scale @ Gain=Max and 4 µs shaping time (± 0.12% typ. for any shaping time).
EQUIVALENT INPUT NOISE	< 10 µV (Gain=max; 4 µs shaping time)
INTERCHANNEL CROSSTALK	<-55 dB at max Gain, 4µs shaping time and 4 V input on adjacent channel
COARSE GAIN RANGE	2bit adjustable (1, 4, 16, 64 circa); set 0 → gain =1; set 1 → gain =4; etc. Normalized respect to minimum gain = 0.8
FINE GAIN RANGE	0÷191 counts adjustable, from 1 to 4 circa; set 0 → gain =1…set 191→ gain = 4 Normalized respect to minimum gain = 0.8
SHAPING TIME	selectable time constant of 0.5 µs, 1 µs, 2 µs and 4 µs by 2 bits (0 leads to 4 µs; 1 to 2 µs etc.)
Pole- zero Adjustment	50 to 2000 µs
Shaping Time for Timing section	1000 ns Diff., 10 ns Int.
Coarse Gain Timing	2bit adjustable (1, 2, 4, 8 circa); set 0 → gain =1; set 1 → gain=2; etc.
CFD THRESOLD	20 ÷ 700mV (settable from 0 ÷ 700mV on 8bit) set 0 /CFD THR=0 mV…set 255/CFD THR=700 mV THR value measured directly on the discriminator; THR = 700 mV correspond to 1V input amplitude, with Coarse gain Timing = 0, Input rise time = 100ns, fall time = 100µs, delay = 100 ns
DELAY VALUE of the CFD30%	selectable by SMD zero Ohm resistance on PCB (soldered on J3 socket) between 15 to 150ns (6 steps): 15ns, 22ns, 30ns, 37ns, 100ns (default), 150ns
DELAY VALUE of the CFD80%	150ns fixed
Rise time linearity (CFD 30% to CFD 80%)	<3% (from 20 ns to 250 ns input rise time)

3. Operating modes

3.1 General information

The Model N1568A is a 16 CHANNEL PROGRAMMABLE SPECTROSCOPY AMPLIFIER & PULSE SHAPE DISCRIMINATOR implemented in a single-width NIM module.
Thanks to its high channel density, this unit allows the optimization of cost and size in multi-detector systems.

3.2 Module operation

At Power-ON, the module contains the last performed settings before Power-Off. The status of these settings can be read out via RS485 serial interface by Terminal (see below). The following paragraphs describe in more detail the single settings.

3.3 Manual settings

By M0 ,M1, M2 and M3 Identification Jumpers, it is possible select the module's Station Number for the Terminal .

The user can select the right delay value of the CFD 30% signal, depending on the rise time of the input signal (see § 1.1.2), by closing with a SMD zero Ohm resistance one of six PCB pads named J3, located on the channel daughter boards (fig. 3.1); default setting shown.

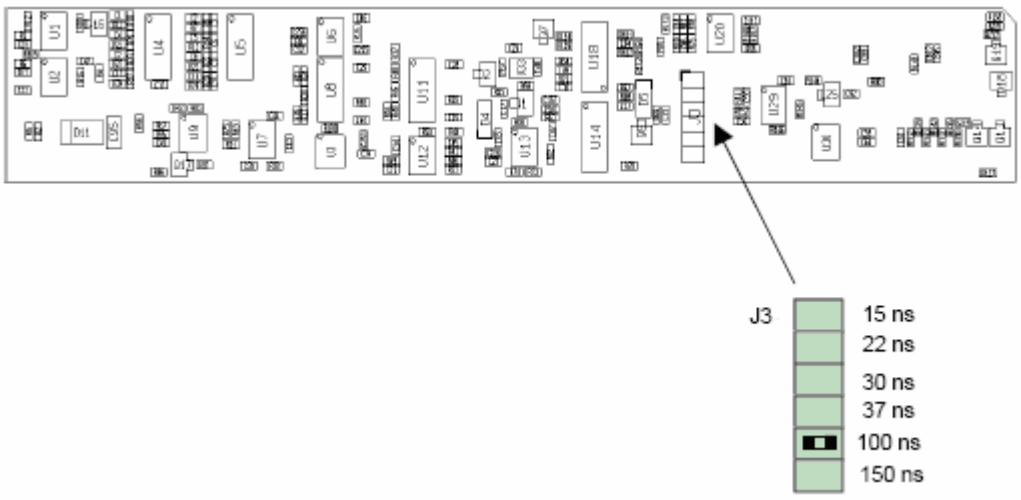

Fig. 3.1: Internal settings

Channel daughter boards can be serviced by sliding off the right side panel (viewing from front panel). Particular attention must be paid to correctly insert the daughter board on the motherboard.

3.4 Parameters setting

3.4.1 Input polarity setting

The selection of the input polarity allows to the internal electronic circuits to operate with the positive or negative signals at the input.
Command key: I(0;1)
Gaussian signal: I0 = positive input polarity ; I1 = negative input polarity

3.4.2 Output polarity setting

The selection of the output polarity allows to select the polarity of the Gaussian output.
Command key: O(0;1)
O0 = positive output polarity ; O1 = negative output polarity

3.4.3 Shape setting

The shaping time can be selected in 4 steps (0 to 3) among the following: 0.5 µs, 1 µs, 2 µs and 4 µs.
Command key: S(0÷3)
S3=0.5µs, S2=1µs…

3.4.4 Pole Zero Adj.

The Pole Zero can be adjusted in 256 step in a range of the tail from 50 µs to 2000 µs.
Command key: P(0÷255)
Range 50÷2000µs

3.4.5 Gain setting

- The Coarse Gain can be set in 4 steps and the selectable values of the gain are 1, 4, 16 and 64.
  Command key: G(0÷3)
  G0=1x, G1=4x…
- The Fine Gain can be set in 192 steps (0 to 191); see table in § 2.7
  Command key: g(0÷191)
  g0=1x…g191=4x
  Normalized respect to minimum gain = 0.8

3.4.6 Discriminator threshold

Using this setting the user can program the threshold discriminator value up to 700mV max., selecting the desired value by 8 bit (see § 2.7 for actual threshold range).
Command key: C(0÷255)
Range 0÷700mV (actual range 20÷700mV)

3.4.7 Gain of Timing section

This setting can be done selecting the value of the programmable gain stage by 2 bits. The gain value can be set to 1, 2, 4, or 8 times.
Command key: T(0÷3)
T0=1x, T1=2x…

3.4.8 Module address selection command

The module enables its MUX output every time it is selected via Module_select command, set via the RS485 port. The enable status is displayed by a green led placed under the E MUX output. MUX outputs are disabled (becoming high impedance), as soon as the module receives a Module_select command with an address different from its own.
When the module is enabled, the channel presented by the MUX outputs depends on the last Channel select command received.
Command key: M(0÷16)
M0=select module ID0, M1= select module ID1…M16=select all modules (Broadcast)

3.4.9 CFD30% Out Width

Using this setting the user can program the CFD30% Out Width (and therefore the CFD80% Out Width), selecting the desired value by 8 bit.
Command key: W(0÷255)
W0=700ns...W255=1µs

3.4.10 Channel selection command

This command allows to select the channel where commands shall be sent. When a channel is selected, the corresponding Output is automatically sent to the “E MUX” output connectors and “CFD MUX” output connector.
Command key: N(0÷15)
N0=select ch0, N1= select ch1…

3.4.11 Export command

This command allows to copy settings from Ch0 to all other channels.
Command key: X1

3.4.12 Help and Update commands

Help command allows to show the commands explanation summary.
Command key: H1

Update command allows to refresh the description of the parameters settings on all channels.
Command key: U1

3.5 RS485 communication

The module can be programmed through a serial interface Standard RS 485. The RS 485 sends and receives data in half duplex modality; a Network of 16 modules can be controlled with an asynchronous serial transmission at 9600 Baud rate.
The connection between modules is realized through a twisted pair; the chain must be terminated with a Jumper on the TERM connector of the last module.
RS485 signals can be adapted to RS232 via a DTE (Data Terminal Equipment) RS485 - RS232 converter (for example ATEN IC485S), which is not provided with the Mod. N1568A . The DB25 to DB9 cables must be configured as follows:

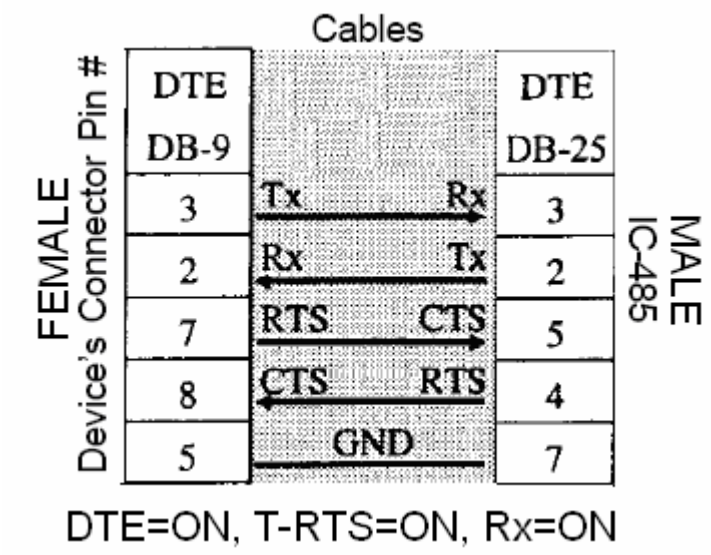

Fig. 3.2: DB25 to DB9 cable setting

Two 50 Ohm resistors must be placed between T+/R+ and T-/R- on the RS-485 / RS-422 Four Terminal Block.

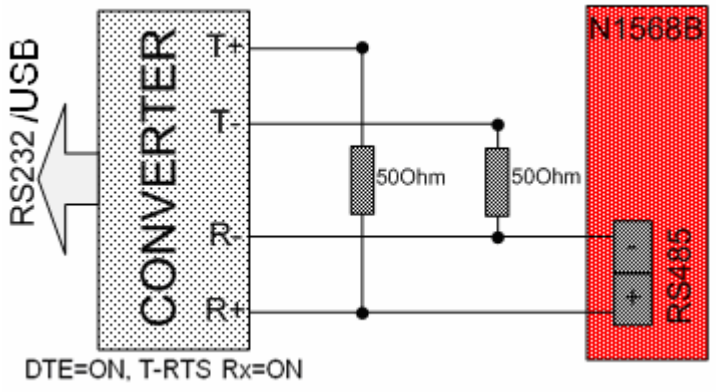

Fig. 3.3: Four Terminal Block Configuration

The module can be easily programmed through a connection with a terminal emulator (such as Hyper Terminal); the module microcontroller handles a simple User interface which allows to access (via a set of commands) all the module functions. Therefore a dedicated software is not necessary. The used PC RS232 Port must be configured as follows:

Table 3.1: RS232 Port Default Settings

Baud rate	9600
Parity	None
Character length	8 bits
Number of stop bits	1 bit
Flow control	hardware

At the Power ON the list of connected modules is displayed.
At this point it is necessary to select at least one module, among those connected to the same serial line communication, via Module address selection command (see § 3.4.8).
(Wait 4 seconds then select the module by typing M0..M15; M16).
After this command, the communication is active only for this selected module and only this module answers to the sent commands.
In order to select Module ID15, type M15:

```
M15
Module 15 (press M15 to select)
_
```

Once the module is selected, wait for another 4 seconds, then this “page” can be seen on the Terminal screen, showing the status of all the parameters and the description of the commands for their setting.

```
Module 0
CH 0 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH 1 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH 2 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH 3 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH 4 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH 5 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH 6 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH 7 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH 8 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH 9 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH10 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH11 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH12 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH13 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH14 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
CH15 CFth= 10 CFWdt=  0 P/Z=180 FG=  0 SH=0 CG=0 CGT=3 PIn OutP
-------------------------- Command Key --------------------------
CH=N CFth=C   CFWdt=W   P/Z=P   FG=g   SH=S CG=G CGT=T In=I Opol=O
UPDATE=U1  HELP=H1 Mod=M eXport=X1
```

All commands require 4 seconds to be executed.

HELP command allows to show the commands explanation:

Command	Description	Key (Values)	Note
Mod	Module Address Selection	M(0-16)	M16=Broadcast
CH	Channel Selection	N(0-15)	Mux out are also selected
CFth	CFD Threshold	C(0-255)	range 0-700 mV.
CFWdt	Width of CFD outputs	W(0-255)	
P/Z	Pole-Zero Compensation	P(0-255)	range INF.-50µs
FG	Fine Gain	g(0-191)	range 1-4X
SH	Shaping Time Selection	S(0-3)	4/2/1/0.5µs
CG	Coarse Gain	G(0-3)	1/4/16/64X
CGT	Coarse Gain Timing	T(0-3)	1/2/4/8X
In	Input polarity	I(0-1)	value 0=Pos. 1=Neg
Opol	Output Polarity	O(0-1)	value 0=Pos. 1=Neg
X	Export	X1	data of CH0 to all CHs

3.6 N1568 Demo software

N1568Demo is a command line application which allows to operate the N1568 using the APIs displayed by N1568Lib.

3.6.1 USB-RS485 Adapter

The USB-RS485 Adapter converts from USB to RS-422/485. The converter is provided, configured for the N1568A, in order to use the module with laptop computers that do not have a serial port. The device is provided with drivers and installation instructions supporting the most used OS's.

Fig. 3.4: USB to RS-422/485 Adapter

3.6.2 N1568Demo installation

- Connect the USB-RS485 adapter's A-type connector to a free USB port on your PC
- Connect the adapter's RS485 connector to the RS485 port on the N1568A
- Turn ON the NIM crate
- Go to http://www.caen.it/nuclear/product.php?mod=N1568A web page
- Open the Software / Firmware Menu
- Download the CAEN_N1568X.Y.zip file
- Unzip the file and launch the CAEN_N1568setup-X.Y.exe
- Go to destination folder CAEN\N1568ToolBox\Demo\N1568Demo\bin
- Launch N1568demo.exe
- Now the N1568A is ready for operation

3.6.3 N1568Demo main page

As the N1568Demo is executed, the following screen will be displayed:

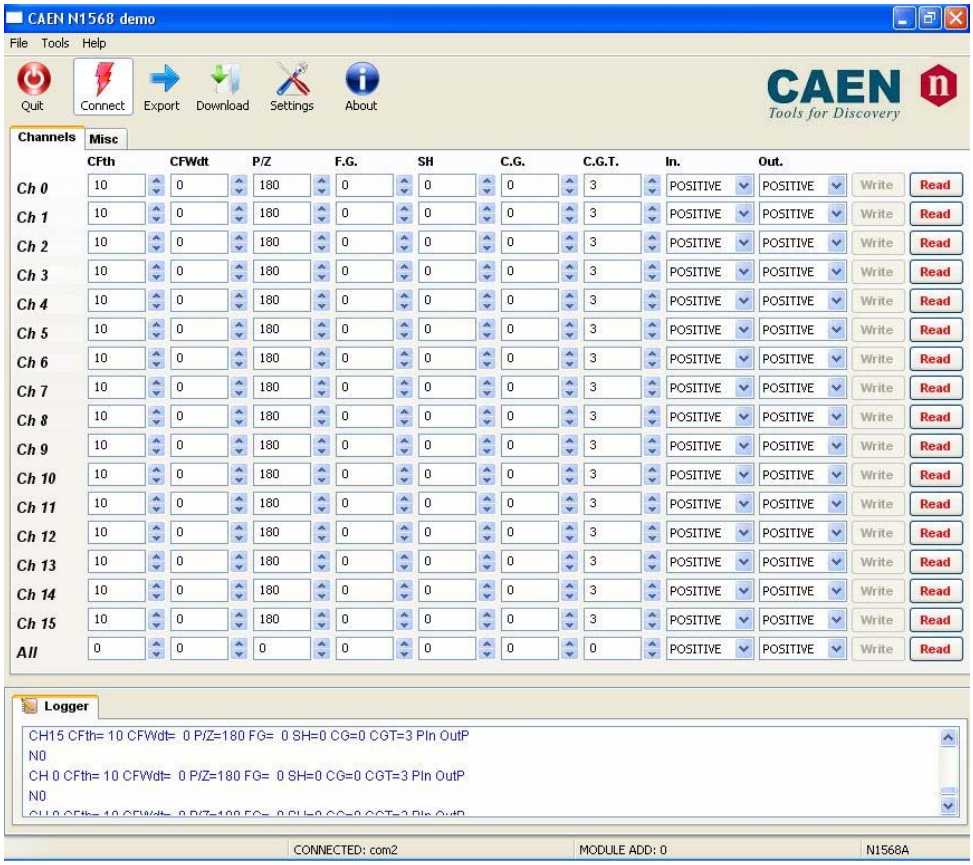

Fig. 3.5: Main page

The tool bar includes six buttons:

Fig. 3.6: Tool bar

3.6.4 N1568Demo connection

The first step is to start connection with the N1568A; click on the **Settings** button in the tool bar.

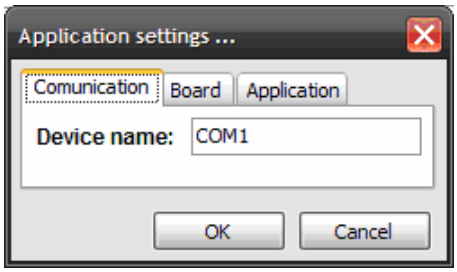

Fig. 3.7: Settings menu

Go to and Select the used device name (check the “My Computer” folder).

3.6.5 N1568Demo Settings Menu: Board

This menu allows to select the Board Type and to set operation parameters (First/Last visible channel, Default module address, Default MUX OUT)

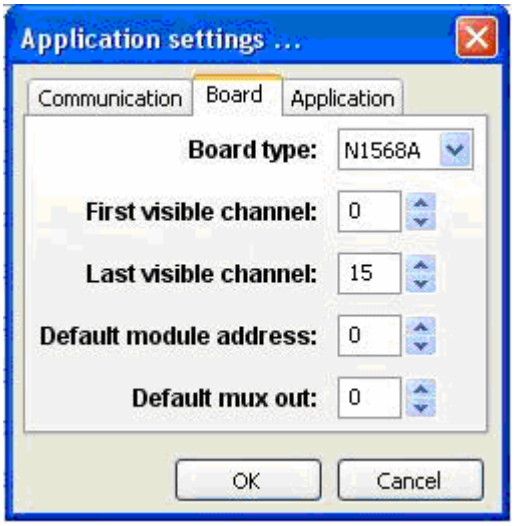

Fig. 3.8: Settings Menu: Board

3.6.6 N1568Demo Misc menu

The Misc thumbnail allows to access the module general settings (Module address, MUX OUT, Direct Command); choose the correct Module Address, then click on the **Connect** button.

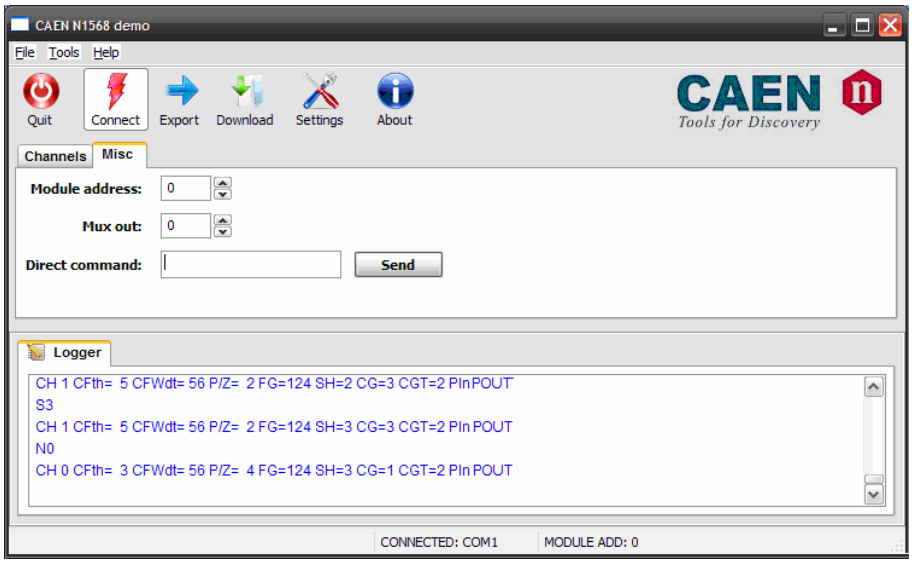

Fig. 3.9: Misc menu

3.6.7 N1568Demo parameters

The available parameters are:

Table 3.2: Parameters description

Name	Description	Value
CFth	CFD threshold	0-1 V
CFWdt	Width of CFD output	700-1000ns
P/Z	Pole zero compensation	50-2000µs
FG	Fine gain	1-4x
SH	Shaping time selection	0.5/1/2/4µs
CG	Coarse gain	1/4/16/64x
CGT	Coarse gain timing	1/2/4/8x
In	Input polarity	0=positive; 1=negative
Out	Output polarity	0=positive; 1=negative

As one parameter is changed (use the **arrows** to increase/decrease), the **Write** button becomes **green** (=active); click on Write to confirm changes.
The **Export** button in the tool bar allows to broadcast data from CH0 to all Channels.

3.7 LabView VIs

A set of LabView8.2 VIs also allows the module's control; such VI's can be found in the CAEN\N1568ToolBox\LabView\8.2\Demo\ folder installed via the procedure described in § 3.6.2. (in the "LabView" folder).
As the program is executed, the following screen will be displayed:

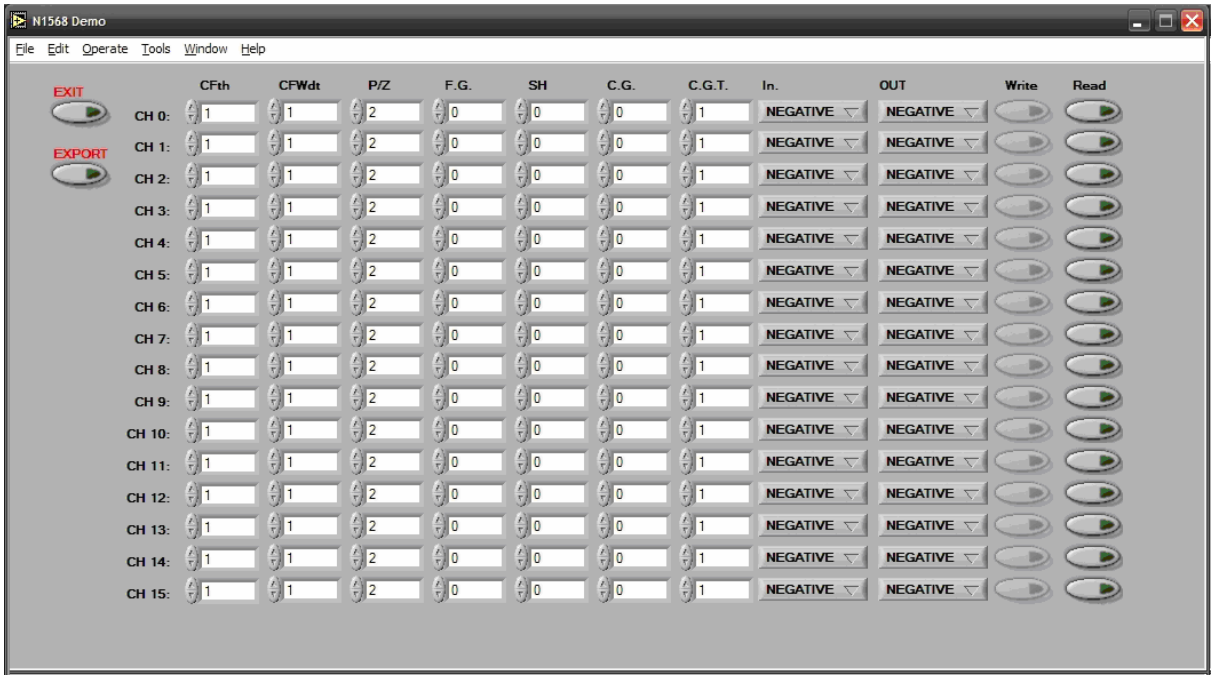

Fig. 3.10: LabView8.2 Demo main menu

CAEN GmbH
Brunnenweg 9
64331 Weiterstadt
Germany
Tel. +49 (0)212 254 4077
Mobile +49 (0)151 16 548 484
info@caen-de.com
www.caen-de.com

CAEN Technologies, Inc.
1 Edgewater Street - Suite 101
Staten Island, NY 10305
USA
Phone: +1 (718) 981-0401
Fax: +1 (718) 556-9185
info@caentechnologies.com
www.caentechnologies.com

CAEN S.p.A.
Via Vetraia 11
55049 - Viareggio
Italy
Phone +39 0584 388 398
Fax +39 0584 388 959
info@caen.it
www.caen.it

CAENspa INDIA Private Limited
B205, BLDG42, B Wing,
Azad Nagar Sangam CHS,
Mhada Layout, Azad Nagar, Andheri (W)
Mumbai, Mumbai City,
Maharashtra, India, 400053
info@caen-india.in
www.caen-india.in