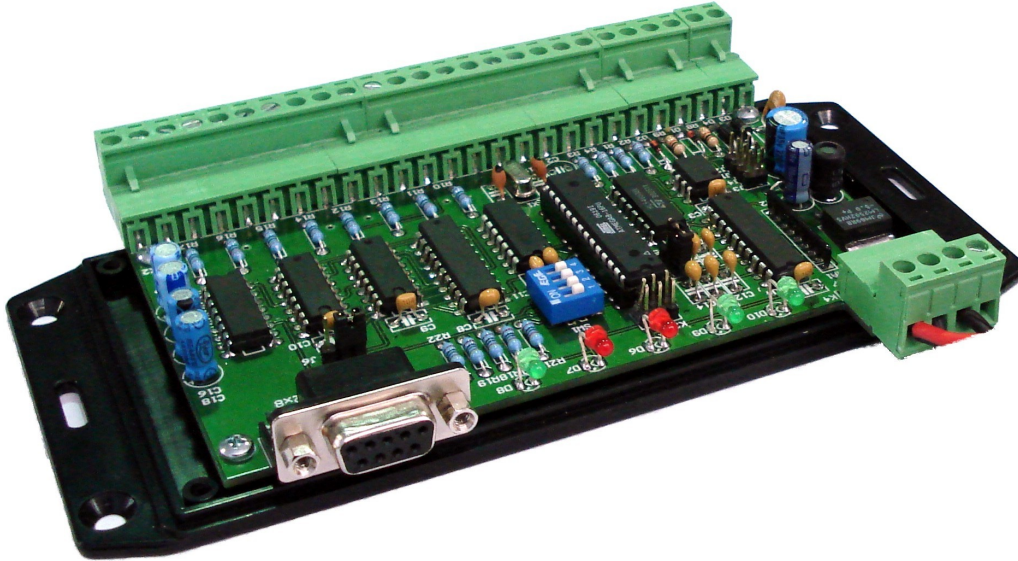


# NM-281A

## NMEA-0183 Multiplier

### User Guide

V1.00



#### Introduction

The NM-281A is a two channel NMEA-0183 input / seven or eight channels NMEA-0183 output multiplier. It enables data distribution from two NM-0183 sources (primary and secondary with priority encoding) to all NMEA-0183 instruments through seven or eight talker ports and PC connection through RS-232. In addition the NM-281A has control terminals that can be connected to a two position external switch to force connection of the first or second input to all outputs. Data from PC's charting system can be delivered back to the autopilot from the same RS-232 port which acts bidirectional (talker and listener).

#### Operation

In the case that automatic operation is enabled (external switch disconnected or at position "0", see figures 1-3), the NM-281A acquires NMEA-0183 sentences from the most significant input and immediately sends them to the general purpose outputs and the RS-232. A watchdog timer routine supervises if the NMEA signals are correctly applied in the primary input and switches to the secondary input whenever there is no NMEA sentence for at least eight seconds. In this case the secondary input starts receiving data if there is an instrument attached. If not, the device automatically returns to the primary input after eight seconds. When the secondary input is already in receiving mode and an NMEA signal is applied to the primary port, the device immediately switches to the primary input. In the case that no signal is applied to any input, the device "circles" around sampling the two listener ports every eight seconds until an NMEA-0183 signal appears to any of the two listener ports.

In the case that an external switch is connected (see figures 1-3), the NM-281A outputs the signals from the first input if switch is at position "1" or signals from the second input if switch is at position "2".

#### Input Ports (listeners)

The NM-281A has two input ports that can be connected to any instrument indented for marine use that can output NMEA-0183 signals. Each one of the two listener ports is optoisolated as specified in NMEA-0183 protocol, thus data(-) pole should never been connected to NM-281A ground. If the instrument's talker port is single ended, connect that terminal to the Ina(+) or Inb(+) input and tide the Ina(-) or Inb(-) to instrument's ground. If a RS-232 signal level is connected the ground pole (GND) should be connected to Ina(+) or Inb(+) and the data pole (TXD) to Ina(-) or Inb(-) respectively.

The two listener ports can acquire NMEA sentences carried in TTL, RS-232 and RS-485/422 signal levels.

## Output Ports (Talkers)

Each of the eight general purpose talker ports can transmit NMEA sentences in both RS422 and TTL signal levels, depending on the connection topology chosen (see figure 1, 2 and 3), and can fan out one instrument. Current drawn from every port can be up to 20mA, efficient enough to drive any NMEA compatible instrument.

The RS-232 port can deliver NMEA sentences to any modern computer running the appropriate software on Windows 98 and above provided that serial communication follows the 4.800/8/N/1. This port is not optically isolated and should be used for testing purposes only to avoid DC leakage. It can be used though to interface a computer system if proper isolation is achieved or if the computer is supplied from an isolated power supply.

The Out8 port has two functionality modes that can be selected via jumper J6 located inside NM-281A (see figure 4). By shorting poles 1-3 on J6, Out 8 converts signals received from computer to RS-422 signal level. This functionality is independent from the rest of the NM-281A circuits and is intended to be used for interfacing Electronic Charting Systems (ECS) with autopilot systems. By shorting poles 1-2 on J6, Out 8 is configured as the eighth output of the NM-281A. Full jumper settings are as follows:

Jumper	Status	Function
J5 (1-2)	short	Enables processing of input signal from CPU. Baud rate of output ports limited to 4.800bps (default)
J5 (1-3)	short	Direct connection to output ports. Baud rate free up to 19.200bps
J6 (1-2)	short	Enables Out 8 as the eighth output (default)
J6 (1-3)	short	Enables connection of the RXD channel of RS232 port to Out 8
J1, J2, J3, J4	Should not be shorted	

The NM-281A can be connected as shown in figures 1,2 and 3 using all RS-422 outputs (figure 1), all TTL outputs (figure 2) or using either the RS-422 or TTL output of each port taking care not to connect the same port for both signal level outputting.

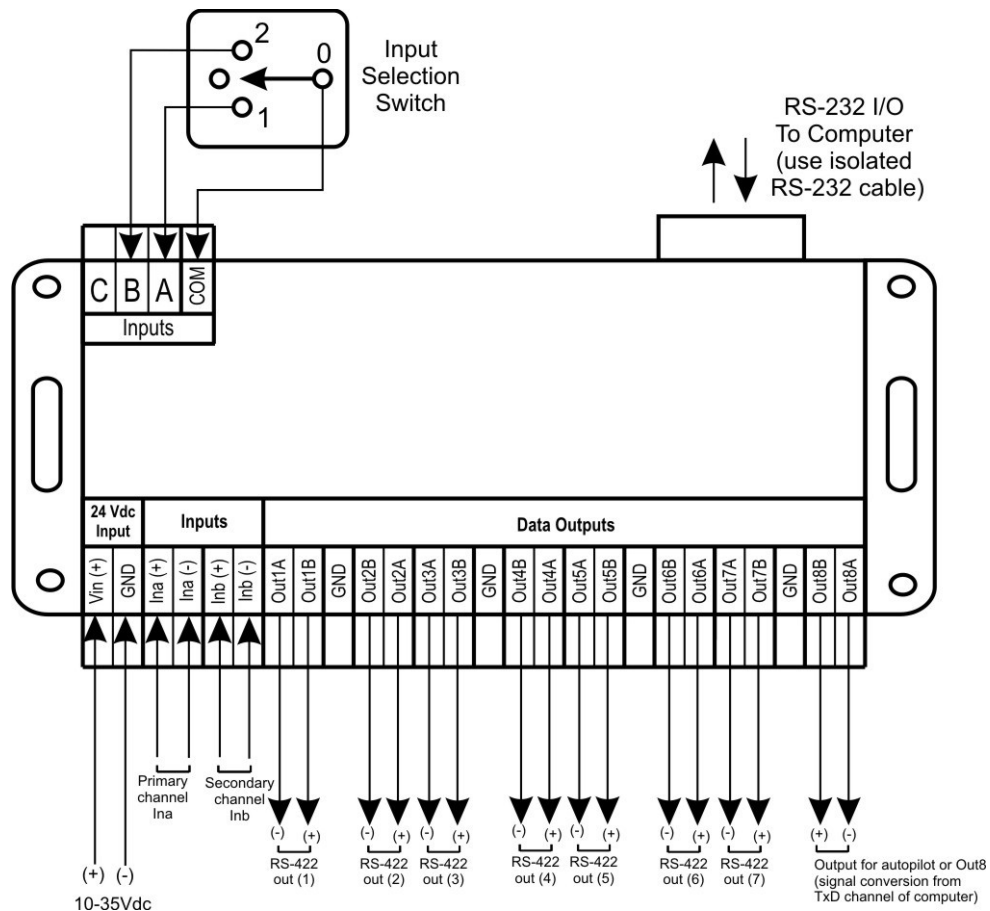


Figure 1: Connection to RS-422 Outputs

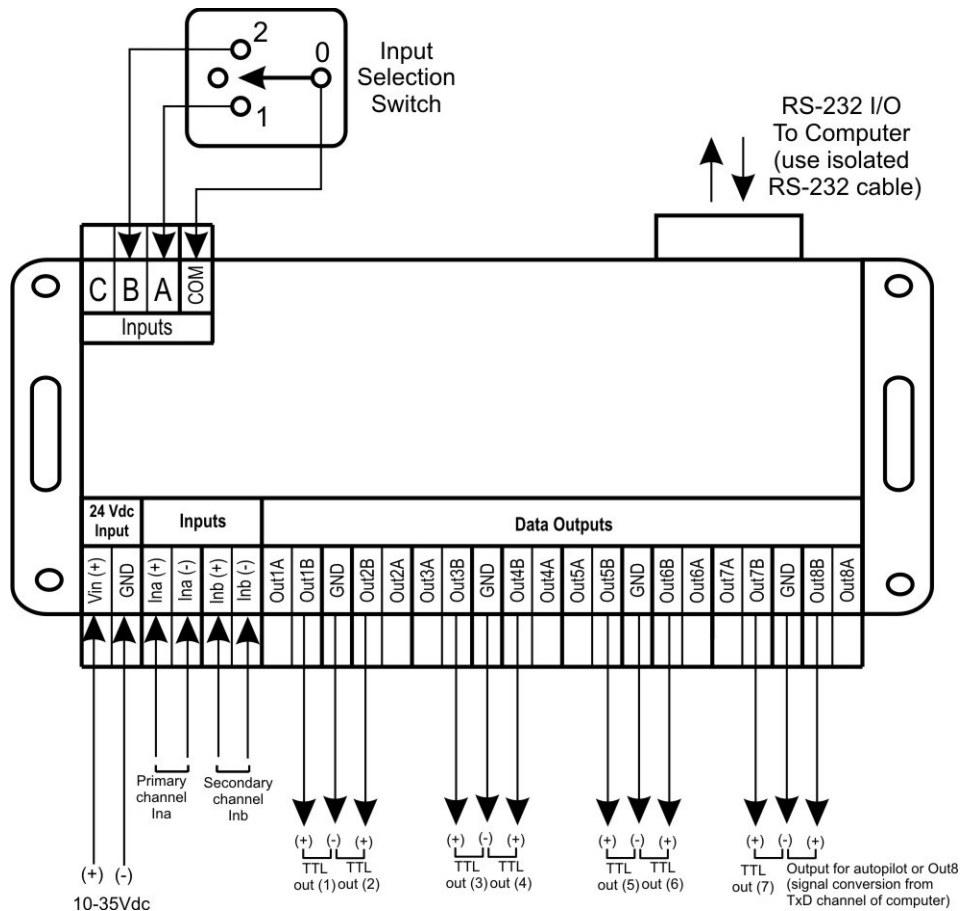


Figure 2: Connection to TTL outputs

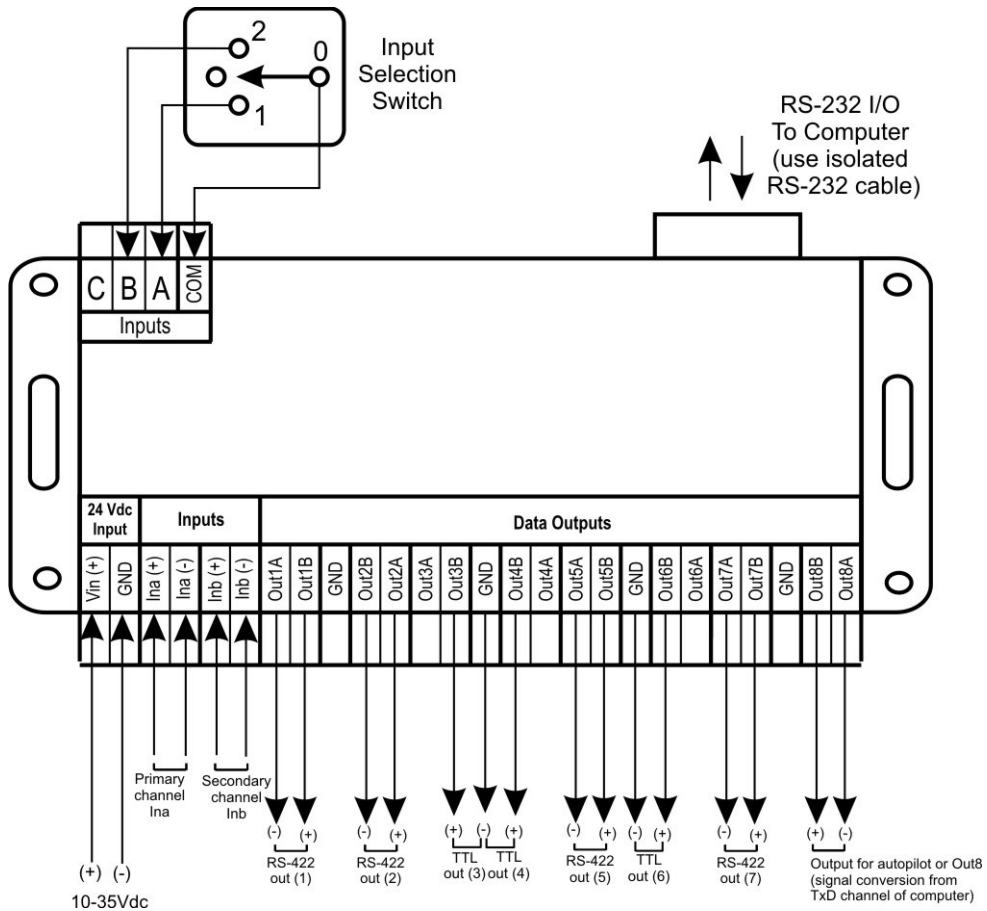


Figure 3: Combined use of TTL and RS-422 outputs

## Power Supply

The NM-281A can be powered within the range of 10-35 Vdc. The nominal voltage of 24 Vdc is advised for powering the device in normal operation.

Power input port has a protection for incorrect polarity connection of the supplying voltage.

## LED Indicator sequence

Inb LED	ON: Currently sampling from secondary port Inb
Ina LED	ON: Currently sampling from primary port Ina
Out 5-7 LED	Flashing indicates data transmission to output port 5 to 7
Out 1-4 LED	Flashing indicates data transmission to output port 1 to 4
Out 8 LED	Flashing indicates reception from RS-232 port and transmission to Out 8 port

## Printed Circuit Board composite layout

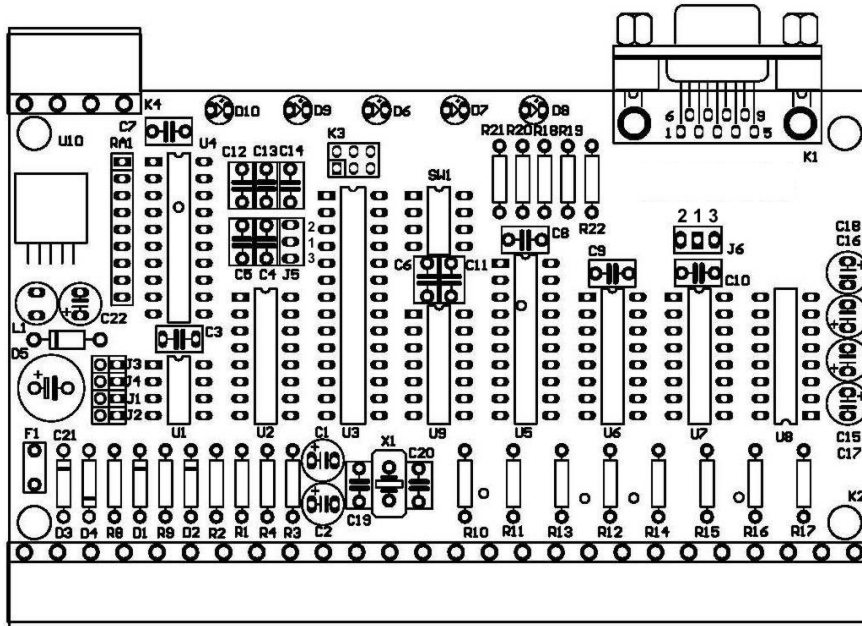


Figure 4: Composite layout of NM-281A printed circuit board

## Specifications

Supply Voltage	9 to 35 Vdc
Power Supply Protection	PTC Resettable Fuse Vmax: 60V, Imax: 40A, Ihold: 0,25A (23°C), Itrip:0,5A (23°C), Max time to trip (23°C): 2,2sec for 1,25A
Current Consumption	50mA in idle state/ 150mA in full output mode
Inputs	2 x NMEA-0183, optically isolated Common Mode Rejection: 10kV/usec, Isolation: 480 Vrms
Input Resistance	1KOhm
Outputs	7 x buffered RS-422/TTL (general purpose) 1 x RS-232 1 x RS-422 signal conversion from RS-232 RXD channel or as 8th output
Output protection	Buffered for all RS-422 outputs
Speed for NMEA inputs	● 4.800/8/N/1 or baud rate free up to 19.200bps user selectable
Speed for NMEA outputs	4.800/8/N/1 or baud rate free up to 19.200bps user selectable 4.800/8/N/1 for RS-232 or baud rate free up to 19.200bps user selectable
Indicators	Most Significant Input (Ina), Less Significant Input (Inb) Data transmission from output ports 1 and 4 (Out 1-4 LED) Data transmission from output ports 4 and 7 (Out 4-7 LED) Data reception from RS-232 interface (Out 8)
Dimensions	Width = 150mm/175,30 mm Depth = 80 mm Height = 49,20 mm
Housing	Styrene