Elproma Elektronika Sp. z o.o.
Dunska 2A, 05-152 Czosnow, Poland
+48 227517680, info@elpromaelectronics.com,
http://www.elpromaelectronics.com

TFD-100

Time & Frequency Distribution Unit

User Manual

Firma jest zarejestrowana w: Sąd Rejonowy dla m.st. Warszawy w Warszawie, XIV Wydz. Gospodarczy Krajowego Rejestru Sadowego,
KRS NR 0000030839 REGON: 011107169, NIP(#VAT): PL5260208680, Kapitał zakładowy: 68 250,00PLN

1 Table of Content

2 Symbols

Caution, refer to manual. Read all instructions in Manual before using this product.

This symbol means the following information is a note that gives you important information that may affect how you use the TFD-100.

CE marking, attesting compliance to applicable European Directives.

3 Important Safety Information

3.1 Important Safety Instructions and Protective Measures

ATTENTION!

These are the important Safety Instructions that should be followed during installation and maintenance of the ELPROMA family product.

IMPORTANT NOTE

This equipment contains hazardous AC and DC voltages. Do not handle any metallic part until the power has been disconnected. Do not assemble, disassemble set when the power is ON. Making wiring and touching cables is strongly prohibited when power is ON. Please refer to your RACK'19 safety instruction to learn more about connecting power to equipment. The TFD-protection system requires PE line to be connected into RACK'19 din rails.

Elproma safety advises:

1. Safety first! Never work alone under hazardous voltage conditions
2. High short circuit current trough conductive materials can cause unit burns
3. Check that the power cord(s), plug(s), and sockets are in good conditions
4. Always use qualified service personnel to install permanently wired equipment
5. Do not handle any metallic part before the main power has been disconnected
6. Take care your power lines and rack'19 frame is properly PE grounded

Depending on your device or the installed options some information is not valid for your device.

CE The device satisfies the requirements of the following EU regulations: EMC-Directive, Low Voltage Directive, RoHS Directive and - if applicable - the Radio Equipment Directive.

3.2 Unpacking

To unpack the TFD -100 unit:

1. Unpack and carefully inspect the unit.
2. Check for physical damage.
3. If no physical damage is apparent, then proceed with making appropriate connections.
   If physical damage is observed, then immediately contact Elproma and the carrier.
4. Save the shipping container for submitting any necessary claims to the carrier.

3.3 Instalation

3.3.1 Required materials

North American or European IEC power cord. One or the other will be supplied with the unit.

Customer supplied double shielded RG223 cables with BNC connectors from source, and to next devices in system.

Rack mounting screws.

Screwdriver for the rack mount screws.

3.3.2 Making connections

Connecting Data Cables

When wiring the devices, the cables must be connected or disconnected in the order of the arrangement described in the user documentation accompanying the device.

Always attach all cables to the plug during connection and removal.

Never pull the cable itself. Pulling the cable can cause the cables to disconnect from the plug. Install the cables in way.

Connecting Power Supply

This equipment is operated at a hazardous voltage. Non-observance of the safety instructions in this manual may result in serious personal injury or property damage.

Before operation, check that all cables and lines work properly and are undamaged. Pay particular attention to the facts that the cables do not have kinks or that they are not too short around corners, and no objects are placed on the cables. Also make sure that all connections are secure.

Faulty shielding or cabling will endanger your health (electrical shock) and may destroy other equipment.

Ensure that all necessary safety precautions have been taken. Make all connections to a unit before turning on the power. Observe the safety instructions on the device (see safety symbols).

In the case of malfunctions or servicing (e.g. in the event of a damaged housing or power cable or when fluids or foreign objects enter), the current flow can be interrupted. Questions about the house installation, need to be clarified with your house administration.

The power supply should be connected with a short, low-inductance line.

3.4 CLEANING

ATTENTION!

Do not wet clean the appliance! Penetrating water can cause considerable dangers to the user (e.g., electric shock).

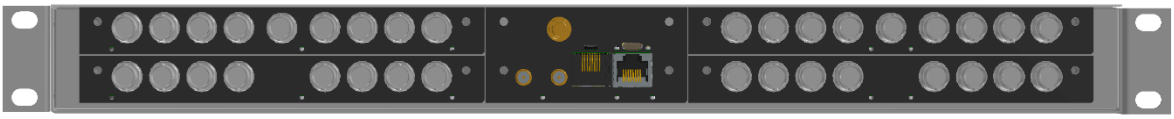
Liquid can destroy the electronics of the device! Liquid penetrates into the housing of the device and can cause a short circuit of the electronics.

Only clean with a soft, dry cloth. Never use solvents or cleaners.

4 TFD-100 Distributor Unit

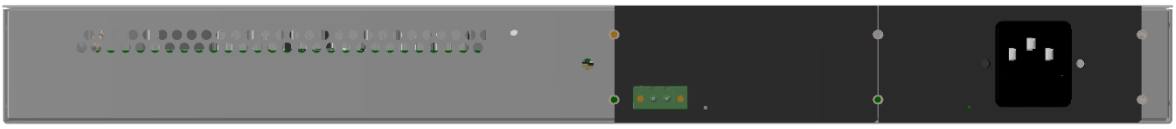
The TFD-100 series is a 1U, rack mount, modular time and frequency distributor. It provides the precise distribution of any frequency from 1PPS up to 10MHz include most popular standards: 1PPS (TTL), IRIG-DCLS (TTL), 10MHz (TTL and Sine).

4.1 Front view*



*modules layout depends on the chosen configuration

4.2 Rear view*



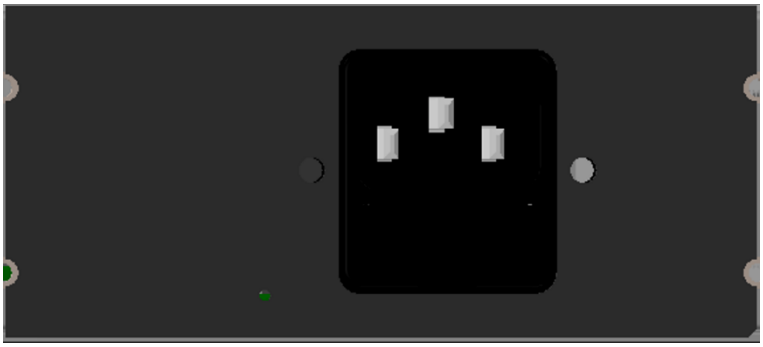
*modules layout depends on the chosen configuration

4.3 Technical Data

Model	TFD-100, Modular Time & Frequency distributor
Inputs	1PPS (TTL), 10 MHz (Sin), 10MHz (TTL), IRIG-DCLS (TTL)
Outputs	1PPS (TTL), 10 MHz (Sin), 10MHz (TTL), IRIG-DCLS (TTL)
Frequency	1 up to 15 MHz
Input/Output	impedance 50 Ω or 100 Ω
* Input/output connectors	BNC or SMA
Rise/Fall time	~1ns
Ambient temperature	0°C to 50°C Humidity 0-95% non-condensed
Power supply	Single or redundant, 85…264V AC, 100…370V DC or 48VDC (36-72VDC) or mixed
Dimensions	483 mm (W) x 45mm (H) x 330 mm (B) – 1U - 19 inch rack mount
Weight	3 - 3.5 kg (depends on number of modules)
Safety	IEC61010-1:2010, IEC61850

4.4 Power

AC power module



Connector Type: IEC320 AC inlet

Fuse: 2x T 1A H 250 V

Input Parameters

Nominal Voltage Range:	100-240 VAC
Maximum Voltage Range	85-205 VAC
Nominal Frequency Range	50-60 Hz
Maximum Frequency Range:	47-70 Hz

LED indicator:

LED Indicator
ON – power module is OK
OFF – No power or damaged power module

WARNING!
This equipment is operated at a hazardous voltage.

DC power module

Connector Type: WR-TBL Series 3175

Fuse: 600mA (Internal)

Input Parameters

Nominal Voltage Range:	46-50VDC
Maximum Voltage Range	36-72VDC

LED Indicator
ON – power module is OK
OFF – No power or damaged power module

Power Supplies Options

TFD-101 – single 85-265VAC/100-370VDC power supply

TFD-102 – dual, redundant 85-265VAC/100- 370VDC power supplies

TFD-110 – single 48V DC power supply

TFD-120 – dual, redundant 48V DC power supplies

TFD-111 – dual, redundant 85-265VAC/100- 370VDC and 48VDC power supplies

4.5 TFM-1218

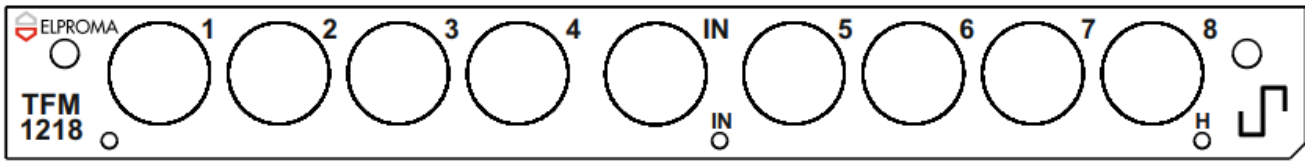
The TFM-1218 module is a 1PPS to 10MHz (TTL) high precision 1/8 distributor module. It provides the precise distribution of any: frequency from 1PPS up to 10MHz ź time code signals IRIG-DCLS (TTL)

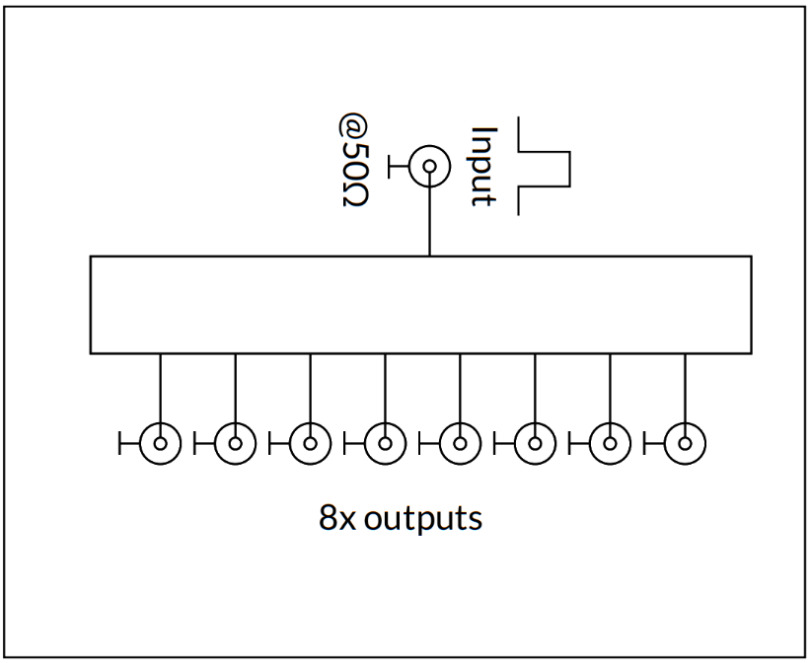
- frequency from 1PPS up to 10MHz
- time code signals IRIG-DCLS (TTL)

Model	TFM-1218 version 1.6
Input	1x @ 50Ω (TTL)
Outputs	8x 2.5V @ 50Ω, or 16x 2.5V @ 50Ω with minion card.
Frequency	1 up to 50 MHz
* Input/output connectors	BNC or SMA
Rise/Fall time	~1ns
Delay input-output	<7.3 ns (typical 6.5ns)
Outputs phase dispersion	<0.7ns (typical 0.3ns)

Front panel legend:

Input port designator: IN
Outputs port designators: 1-8
Signal indicator: INP
Power Indicator: PWR





4.6 TFM-1228

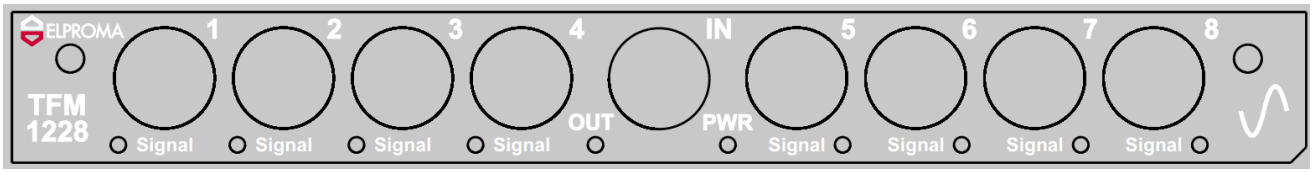
The TFM-1228 module is a 10MHz analog sine 1/8 distributor module. It provides the distribution of:
§ frequency from 1Hz up to 15MHz Sine Signal

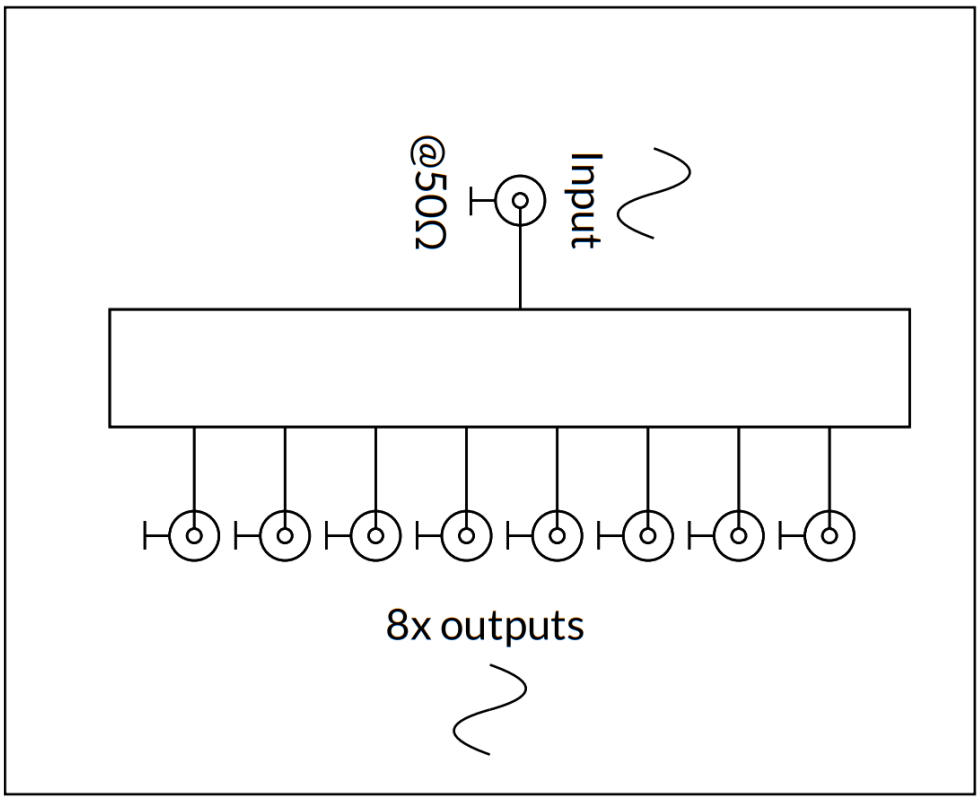
- frequency from 1Hz up to 15MHz Sine Signal

Model	TFM-1228 version 2.3
Input	-8dBm to 13dBm @50Ω
Outputs	8x 1Vpp (13dBm) @ 50Ω, or 16x1Vpp (13dBm) @ 50Ω with minion card.
Frequency	1 up to 15 MHz
* Input/output connectors	BNC or SMA
Total Harmonic Distorsion (THD)	<-40dBm

Front panel legend:

Input port designator: IN
Outputs port designators: 1-8
Global signal indicator: OUT
Channel signal indicator: Signal
Power Indicator: PWR

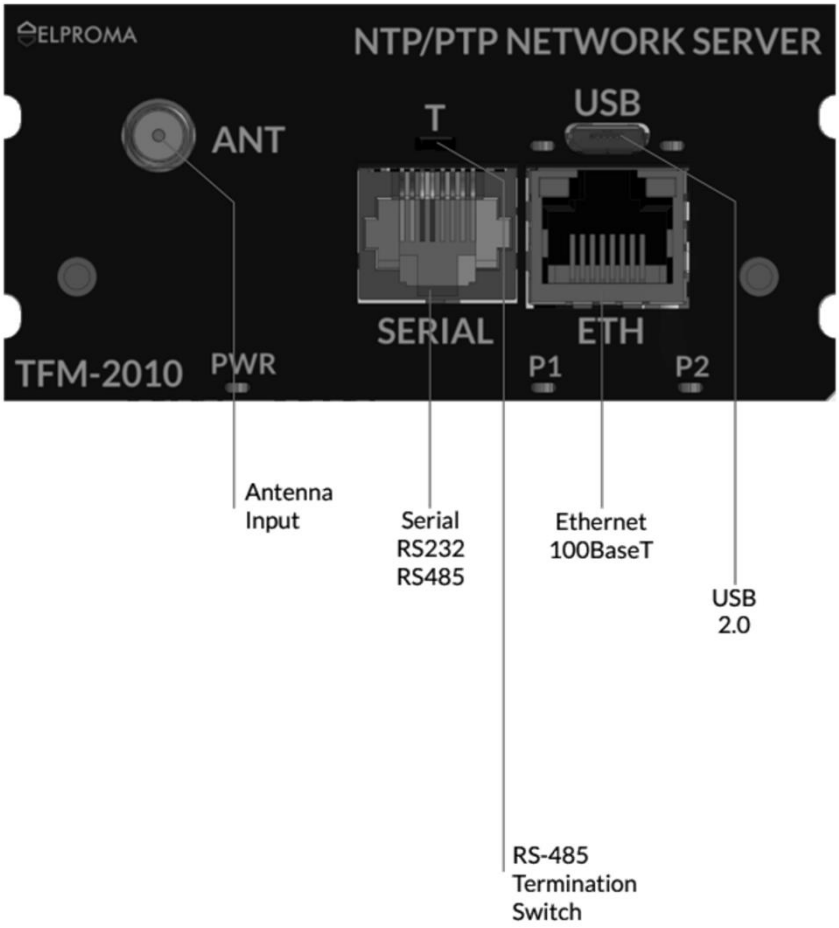




4.7 TFM-2010

GPS/GLONAS/Beidou network time server (NTP, PTP). Includes high quality TCXO 10MHz frequency source synchronized to GPS. TFM-2010 is next generation Industry 4.0, time server module. It delivers time directly to network using NTP and IEEE1588 protocols. It is equipped with single 100/10Mbps Ethernet port working with IPv4/IPv6*. Devices supports hardware PTP timestamping. Unit also has the natural air cooling. It has been designed for autonomous vehicle market. It has very fast clock recovery important to start synchronisation until GNSS not ready (cold/warm start problem). It is equipped with GNSS antenna and 30 meter coax cable (SMA ended). Server has multi-satellites receiver simultaneously supporting: GPS, GLONASS. It is GALIELO*, BEIDOU* ready. Server module has very fast (less than 0.5ms +/- 1ppm) Time To First Fix TTFF synchronization startup. The GNSS receiver accuracy is better than 15ns (at 2 sigma). Server supports cryptographic authentication for NTP. Holdover mode ensure synchronization accuracy to be better than 4ms in first hour. After 24h the max. holdover error is not bigger than 100ms on server output. When normally operating its accuracy is better.

For more information about module configuration refer to NTS-pico3 User Manual



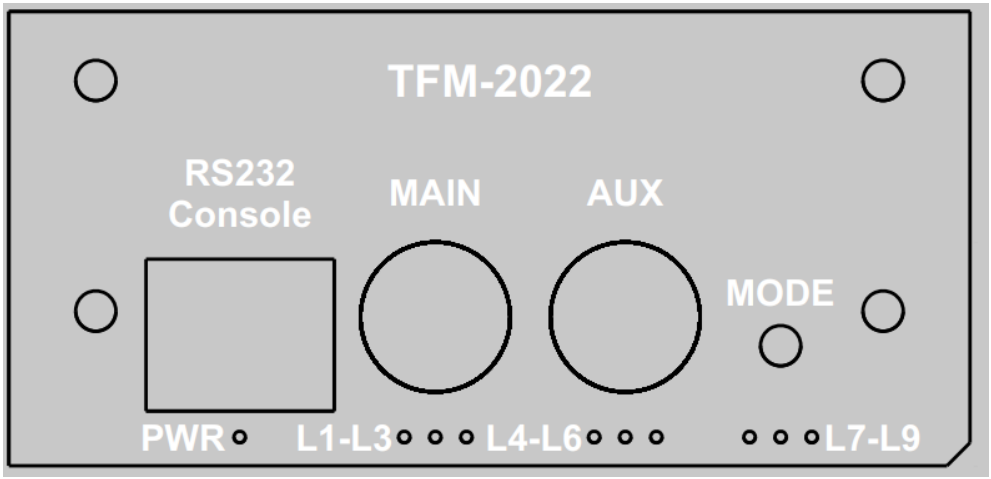
4.8 TFM-2022

The TFM-2022 module is a universal input module with redundancy. It provides two redundant inputs with 3 selection modes and signal type detection.

Model	TFM-2022
Input	-8dBm to 18dBm @50Ω
Outputs	8-32 outputs -8dBm to 18dBm @50Ω from 1-4 TFM-1228 modules
Frequency	1 up to 15 MHz
Input connectors	BNC or SMA
Total Harmonic Distorsion (THD)	<-40dBm

Front panel legend:

Input ports designator: MAIN, AUX
Console port designator: RJ45 RS232 Console
Mode selection switch designator: MODE
Signal Type indicator: L1-L3, L4-L6
Mode indicator: L7-L9
Power Indicator: PWR



Signal indicator decription

Signal Type	MAIN	AUX
10MHz	L1	L4
IRIG	L2	L5
1PPS	L3	L6

Mode description

LED	MODE	Description
L7	FORCE MAIN	Only MAIN input is active. SIGNAL from MAIN is on each output.
L8	FORCE AUX	Only AUX input is active. SIGNAL from AUX is on each output.
L9	AUTO	Both inputs are active. If there is signal on MAIN input, these signal will be on each output. If there is no signal on MAIN input, signal from AUX will be on each output channel. In case of return of signal on MAIN input. MAIN input will be selected.

Console

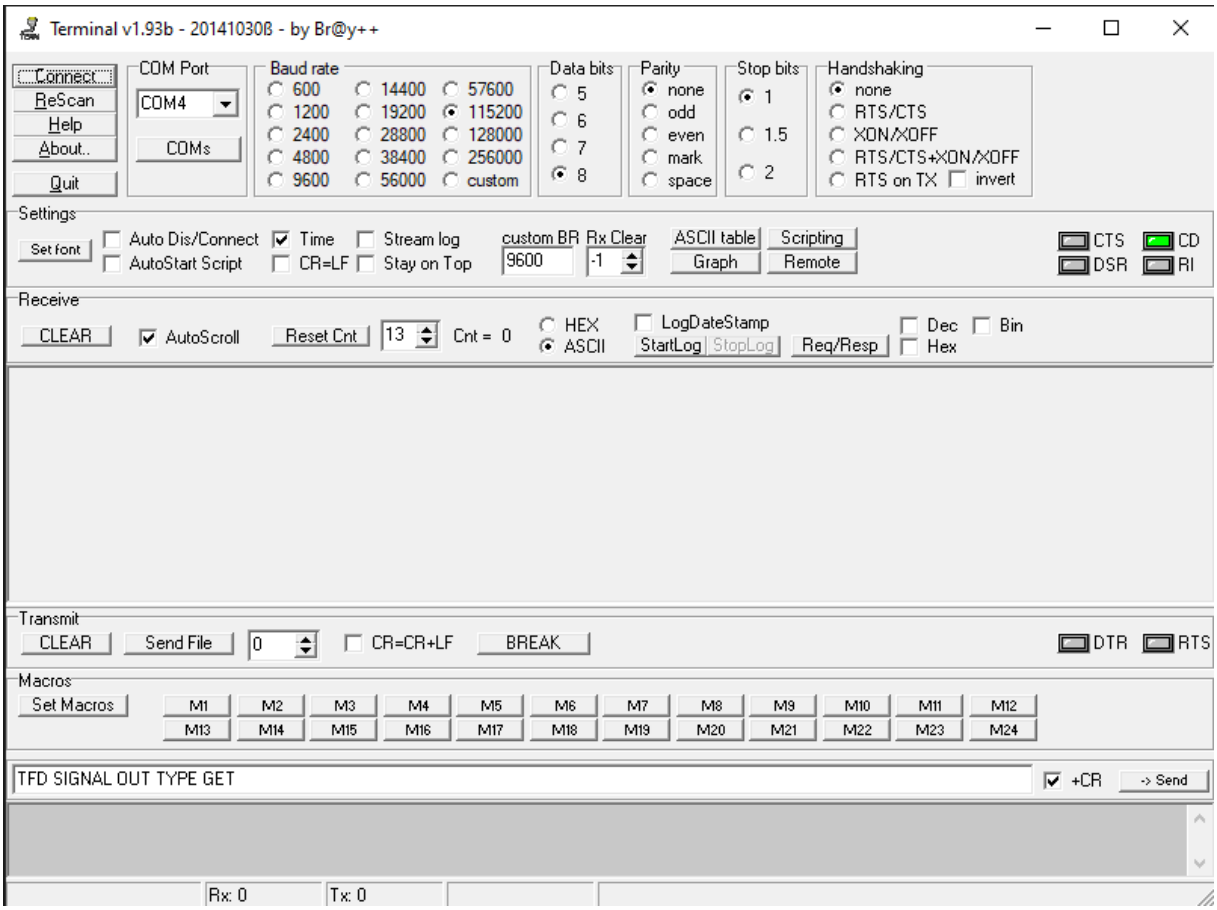
Connector: RJ45 with Cisco compatible pinout

Rj45 Pin	1	2	3	4	5	6	7	8
Signal	N.C.	N.C.	RxD	GND	GND	TxD	N.C.	N.C.

RS232 port configuration:

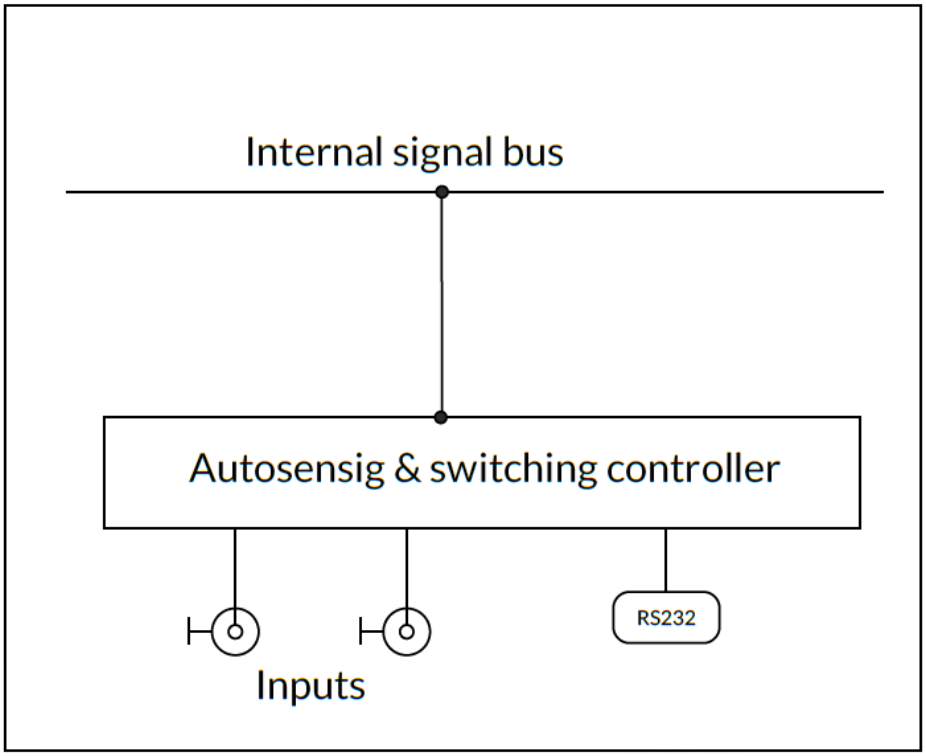
Baude rate	***Parity***	***Data bits***	***Stop bits***	***Handshaking***	***CMD end line***
115200	***None***	***8***	***1***	***None***	***CR***

We are recommend using Open Source Terminal applications: *Terminal by Br@y++* .



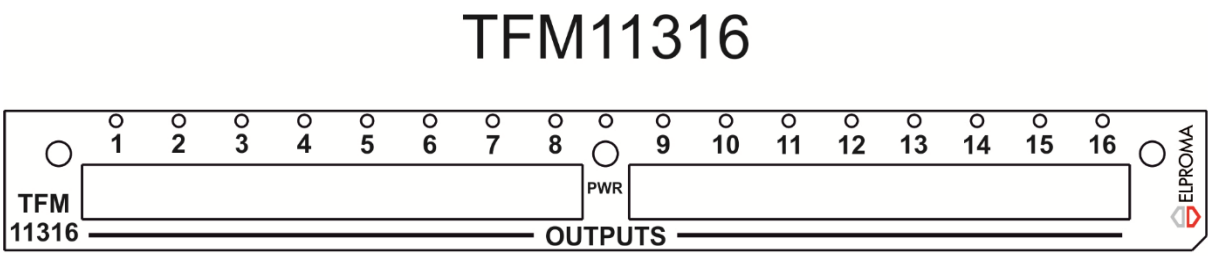
Console Comands

CMD	Output
TFD SIGNAL OUT MODE SET AUTO	Set selection mode to AUTO
TFD SIGNAL OUT MODE SET FORCE MAIN	Set selection mode to FORCE MAIN
TFD SIGNAL OUT MODE SET FORCE AUX	Set selection mode to FORCE AUX
TFD SIGNAL OUT MODE GET	Get current selection mode (AUTO, FORCE MAIN, FORCE AUX)
TFD SIGNAL OUT SOURCE GET	Get current signal source (MAIN, AUX)
TFD SIGNAL OUT TYPE GET	Get current signal type (10MHz, 1PPS, IRIG)
TFD MAIN IN TYPE GET	Get signal type on MAIN input (10MHz, 1PPS, IRIG)
TFD AUX IN TYPE GET	Get signal type on AUX input (10MHz, 1PPS, IRIG)
TFD VERSION	Get firmware version



4.9 TFM-11316

The TFM-11316 module is a RS-422 output splitter.

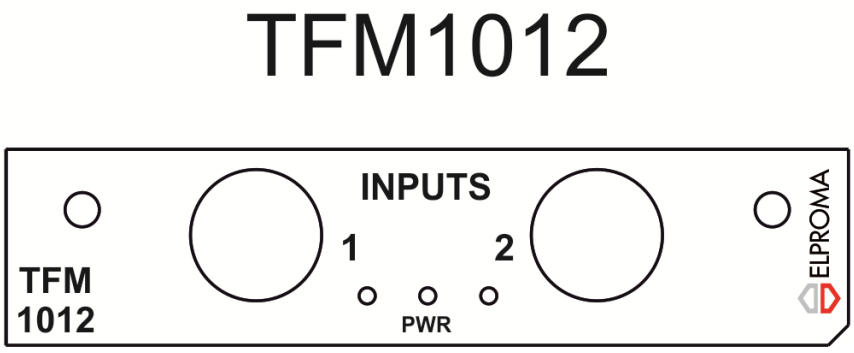


Specification:

OUTPUT	RS-422 Vhi 3V3
Output connectors	2pin 3.5mm terminal block
Rise Fall time	~3.5ns
STD dev	~34,500ps

4.10 TFM-1012

The TFM-1012 is a module with two digital inputs for 1PPS and 10MHz. This module has two separate inputs that can be used for separate output cards. It can also be used only one input for all output cards.

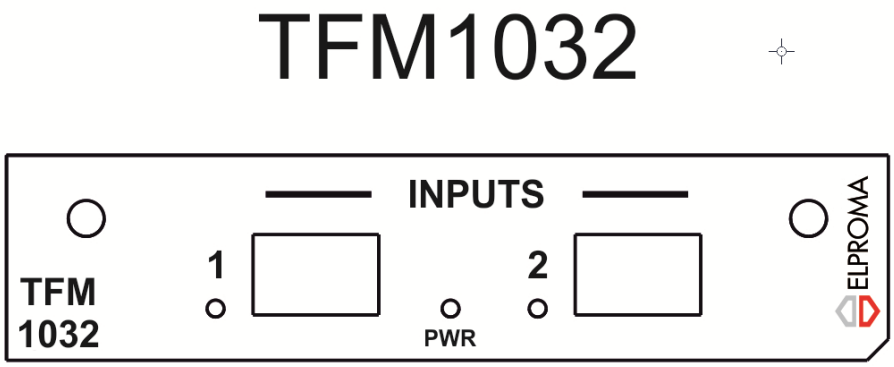


Specification:

INPUT	0-5V 50Ω
Input connectors	BNC or SMA

4.11 TFM-1032

The TFM-1032 is a module with two RS-422 inputs. This module has two separate inputs that can be used for separate output cards. It can also be used only one input for all output cards.



Specification:

INPUT	RS-422
Input connectors	3pin 3.5mm terminal block

5 Appendix

For detailed product technical specification please visit:

www.elpromaelectronics.com

TEL. +48 22 751 76 80