ELPROMA

Time & Frequency Distribution

TFD-100 series

The TFD-100 series is a 1U, rack 19" mount, modular time and frequency distributor unit. It provides the precise distribution of any:

- frequency from 1PPS up to 10MHz
- time code signals IRIG, AFNOR, NASA
- decoded signals GNSS, DCF77, TDF, WWVB

... and many others

This including most popular standards:

1PPS, 10MHz, IRIG-B AM, IRIG-DCLS

Time code and frequency

- 1PPS, PP5S, PPM, PPQH, PPHH, PPH, PPD
- 10MHz, 5MHz, 2.048MHz, 1.544MHz
- IRIG-B and A/C/D/E/F/G/H AM&DCLS
- NASA 20/28/36, AFNOR, STANAG4430
- XR3/2137 25 1PPS 1-Second Time Code
- Bi-level 5-rate slow Code Symmetricom
- GNSS NMEA183 +1PPS Code ELPROMA

Features

- 1 to 36* signal splitter
- Conversion to/from IEEE1344
- Clock recovery from IEEE1588 (LAN)
- Clock disciplined to GNSS
- TTL, RS422/RS485, Sine support
- High precision and low noise
- Modular construction
- 3 Year Warranty

* depends on number of output modules

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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/RS-422), 10MHz (TTL and Sine).

You can order the following base modules that differ in power supply:

- 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

Input modules:

- TFM-1012 – two digital inputs (level TTL/50Ω) for 1PPS and 10MHz. Input sockets: BNC or SMA.
- TFM-1022 – two switched, analog 10MHz (min. 300mV p-p) inputs for frequency distribution. Input sockets: BNC or SMA.
- TFM-1032 – two switched, digital, differential (standard RS422/RS485@100Ω) inputs for IRIG-DCLS. Input sockets: Terminal Block (3.5 mm)
- TFM-1042 – two switched, digital fiber-optics inputs for 1PPS, IRIG-DCLS, 10MHz signals. Transmission over a distance up to 2.5 km. Input sockets: ST, SC or FC.
- TFM-2000 – GPS/GLONAS/Beidou disciplined TCXO precise time and frequency source. It provides 1PPS, 10MHz TTL signals and ToD (NMEA serial).
- TFM-2010 – GPS/GLONAS/Beidou network time server (NTP, PTP). Includes high quality OCXO or TCXO 10MHz frequency source synchronized to GPS.
- TFM-2020 – PTP Slave, high precise time/frequency source module.

Output modules:

- TFM-1114 – four digital outputs module (TTL @50Ω) for 1PPS, IRIG-DCLS, 10MHz. Output sockets: BNC or SMA
- TFM-1124 – four analog 10MHz sinus (3V p-p @ 50Ω) outputs module. Output sockets: BNC or SMA
- TFM-1134 – four digital (RS422/RS485 standard) outputs module for IRIG-DCLS. Output sockets: Terminal Block 3.5 mm
- TFM-1144 – four digital fiber-optics outputs module for 1PPS, IRIG-DCLS, 10MHz. Transmission over a distance up to 2.5 km. Output sockets: ST, SC or FC.

High precision distributor modules:

- TFM-1218 –high precision 1/8 digital distribution module (TTL @50Ω) for 1PPS, IRIG-DCLS, 10MHz. 1x input, 8x output. Sockets: BNC (TFM-1218BNC) or SMA (TFM1218SMA).
- TFM-1228 – 1/8 analog 10MHz sinus (8dBm @ 50Ω) distribution module. 1x input, 8x output. Sockets: BNC (TFM-1228BNC) or SMA (TFM1228SMA).

Technical data

| Model	TFD-100, Modular Time & Frequency distributor
Inputs	1PPS (TTL), 10 MHz (Sin), 10MHz (TTL), IRIG-DCLS (TTL), IRIG-DCLS (RS422/RS485), FO fiber optic
Outputs	1PPS (TTL), 10 MHz (Sin), 10MHz (TTL), IRIG-DCLS (TTL), IRIG-DCLS (RS422/RS485), FO fiber optic
Frequency	0 up to 10 Mhz *
Input/Output impedance	50 Ω or 100 Ω *
Input/output connectors	BNC or SMA, Terminal Block 3.5 mm (depends on module version)
Rise/Fall time	1.5 - 20 ns*
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
Warranty	Three-Year Warranty
Technical support	Elproma offers free lifetime technical support via email or phone.

*it depends on type of module
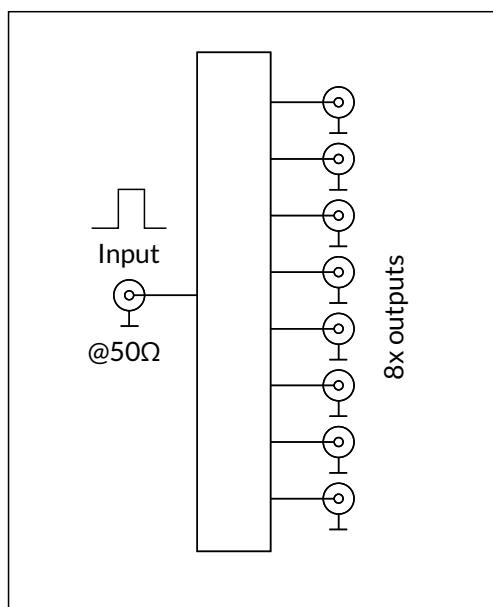
TFM-1218

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
• time code signals IRIG-DCLS (TTL)

Technical data

| Model	TFM-1218 version 1.0
Input	1x @ 50Ω (TTL)
Outputs	8x 2.5V @ 50Ω,
Frequency	0 up to 10 MHz
Input/output connectors	BNC or SMA
Rise/Fall time	<2 ns (typical 1.5 ns)
Delay input-output	<7.3 ns (typicical 6.5ns)
Outputs phase dispersion	<0.7ns (typical 0.3ns)
Dimensions	168x160x20mm
Warranty	Three-Year Warranty
Technical support	Elproma offers free lifetime technical support via

TFM-1228
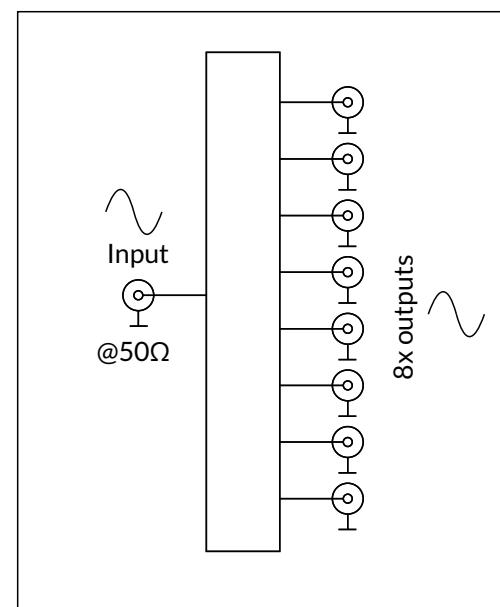
The TFM-1228 module is a 10MHz analog sine 1/8 distributor module.
It provides the distribution of:

▪ frequency from 10MHz Sine signal

Technical data

| Model	TFM-1228 version 1.0
Input	1x 1Vpp@ 50Ω
Outputs	8x 1Vpp (7dBm) @ 50Ω
Frequency	10 MHz
Input/output connectors	BNC or SMA
Total Harmonic Distorsion (THD)	<-40dBm
Dimensions	168x160x20mm
Warranty	Three-Year Warranty
Technical support	Elproma offers free lifetime technical support via

TFM-1114
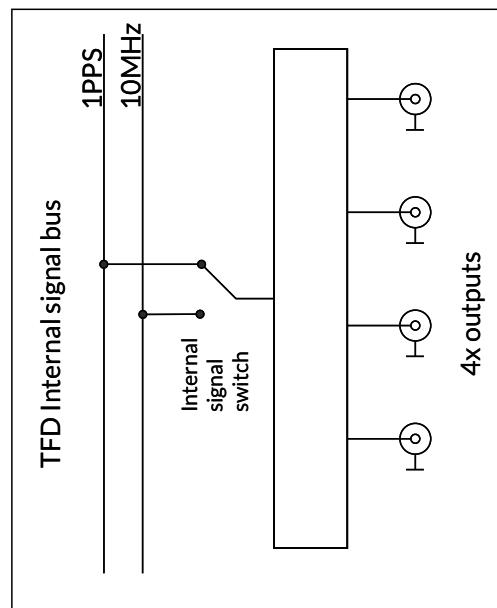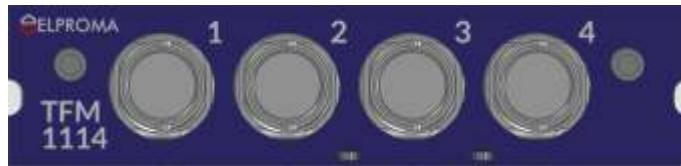
The TFM-1114 module is a 1PPS to 10MHz (TTL) precicision 4 output module.
It provides the precise distribution of any:

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

Technical data

| Model	TFM-1114 version 1.0
Outputs	4x 2.5V @ 50Ω,
Frequency	0 up to 10 MHz
Output connectors	BNC or SMA
Rise/Fall time	<5 ns (typical 2 ns)
Delay input-output	<20 ns (typicical 15ns)
Outputs phase dispersion	<0.9ns (typical 0.5ns)
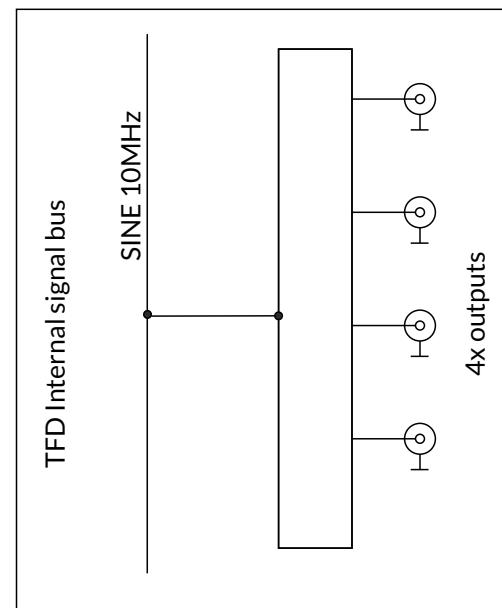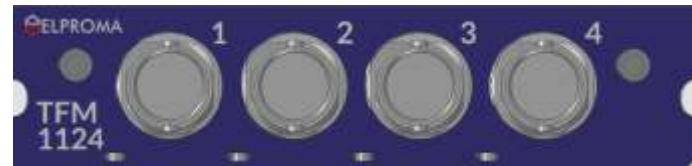
TFM-1124

The TFM-1124 module is a 10MHz (Sinus) 4 output module. It provides the precise distribution of:

- frequency from 10MHz Sine signal

Technical data

| Model	TFM-1124 version 1.0
Outputs	4x 1Vpp(7dBm) @ 50Ω,
Frequency	10 MHz
Output connectors	BNC or SMA
Total Harmonic Distorsion (THD)	-40dBm

TFM-1012

The TFM-1011 module is a 1PPS and 10MHz (TTL) precicision input module. It enables 1PPS and 10MHZ signals to be provided to the internal signal bus.

Technical data
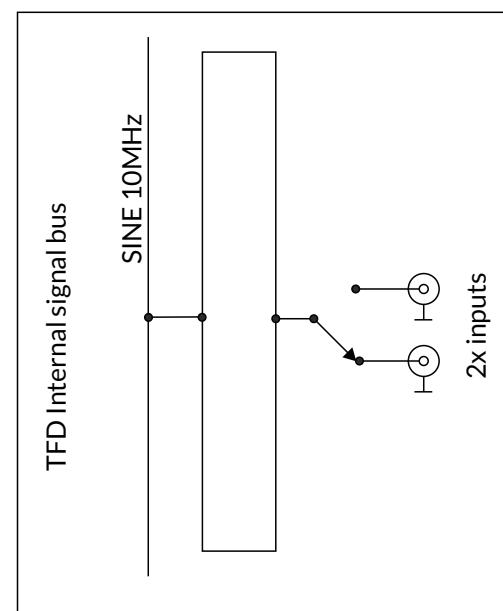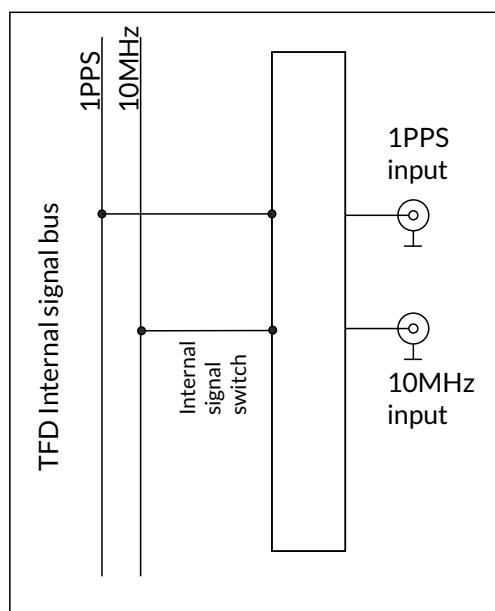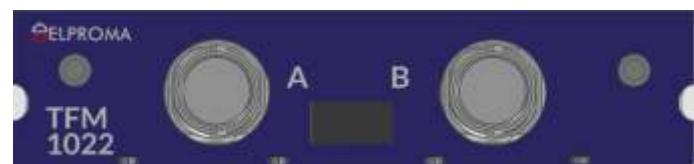
| Model	TFM-1012 version 1.0
Inputs	2x 2.5V @ 50Ω,
Frequency	0 up to 10 MHz
Input connectors	BNC or SMA
Rise/Fall time	<5 ns (typical 2 ns)
Delay input-bus	<10 ns (typicical 7ns)

TFM-1022

- The TFM-1022 is a 10MHz (Sinus) 2 input module. It provides the inputs o 10MHz Sine signal from two separate sockets with manual switching.

Technical data

Model	TFM-1124 version 1.0
Outputs	2x 1Vpp(7dBm) @ 50Ω, manual switched
Frequency	10 MHz
Input connectors	BNC or SMA

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 time-stamping. 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 than 200 ns.

Technical data

Model	TFM-2010 version 1.0
Antenna interface	1x SMA, 30m coax H155
Holdover OSC	TCXO
sync PROTOCOL	NTP, PTP IEEE1588
std. GNSS	GPS, GLONAS
#CHANNELS	32
hardware STAMP*	accuracy < 200 ns
software STAMP	accuracy < 800us
1PPS OUTPUT	1x SMA
Time/DAYTIME	RFC(867-8)*
#LAN	x1, 100Mbps RJ-45
TCP/IP	Ipv4, Ipv6*, TCP, UDP
MANAGEMENT	HTTP, HTTPS, SSH, TELNET
SECURITY	Autokey, DSA, SSL, MD5, RSA
Interfaces	Rs232, RS485, USB 2.0

* extra feature