MLT 3rd Series

MLT PX-10

Windows 10 supported

CXPI supported

MLT 3rd Series
MLT PX-10 Hardware
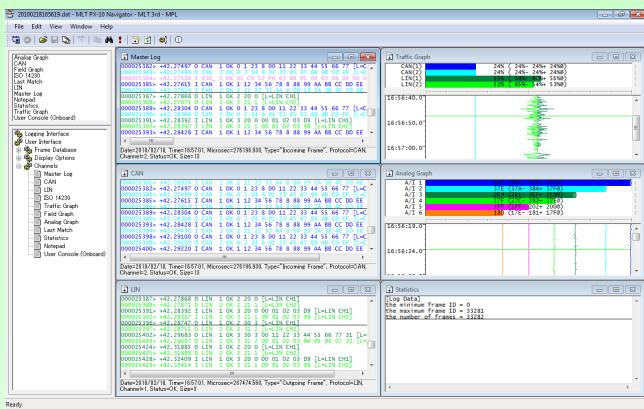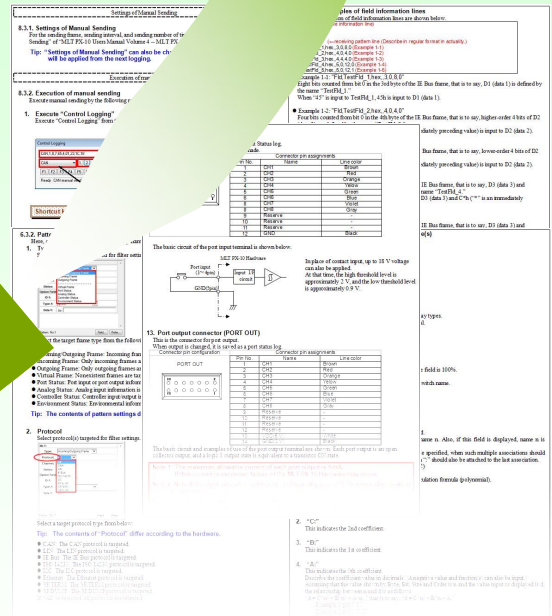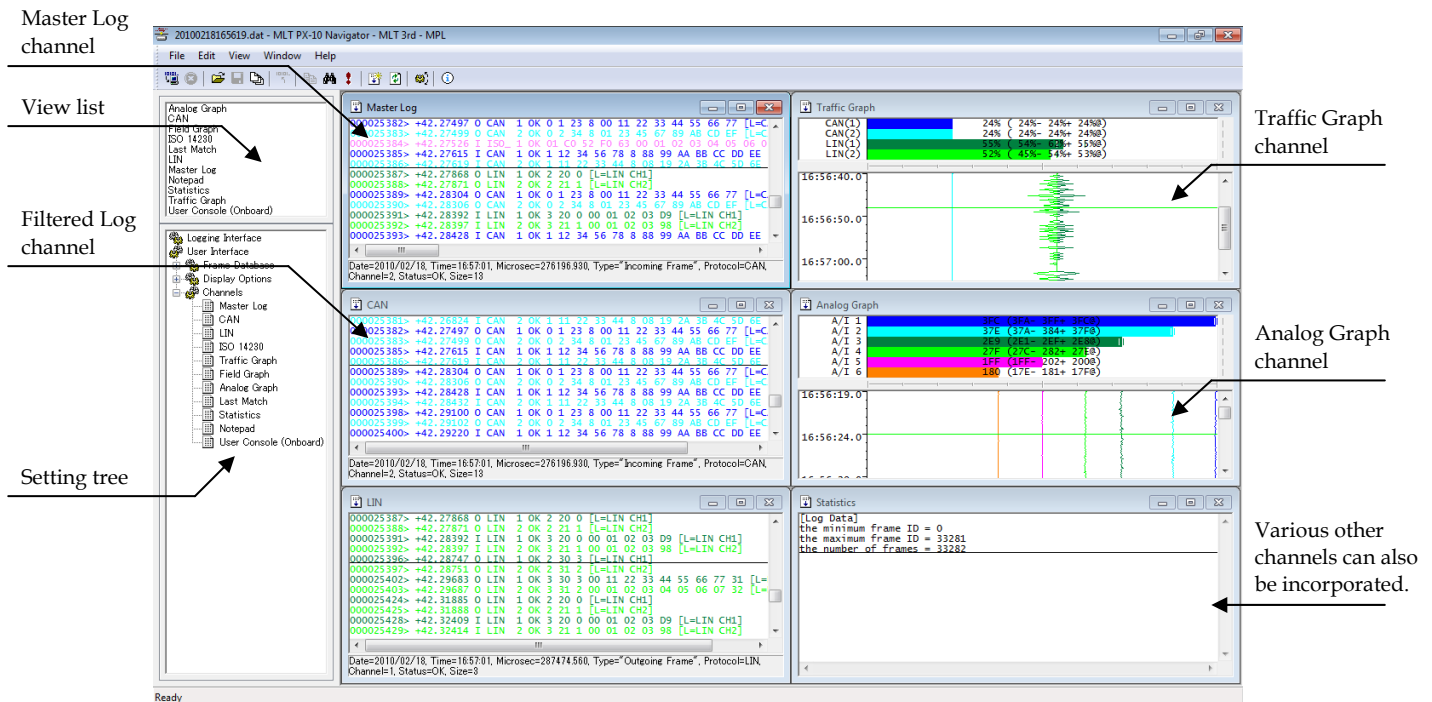
Features

- CAN, LIN, ISO 14230, IE Bus, I2C, Ethernet, and CXPI are supported. Supported protocols are dependent on the hardware model to be used.

- Port input, port output, analog input, and controller input/output are supported.

- All the supported protocols and each input and output can be logged on the same time axis in real time.

- The timestamp accuracy is 1 µs. For port input, it can be improved to 10 ns.

- Filter function, database function, and search function are included. These all employ a strong pattern-matching method.

- Frame-sending functions, such as "manual sending", "response sending", "event sending", "periodic sending", and "programmed sending", are included.

- Trigger function is included. It monitors specified protocols and raises trigger events on the port input and output.

- Traffic rates, field values, and analog-input values can be displayed as graphs and current values.

- Selected frames can be output in a CSV file or a programmed-sending script.

- Filter settings and channel settings can be changed without stopping logging.

- User-defined modules, written in our original language pScript, can be executed.

- Stand-alone operation is supported. The hardware can work without a PC, with its settings stored in its flash memory.

- Even during the stand-alone operation, a user-defined module can be executed.

- The users manual contains detailed descriptions, consisting of several volumes.

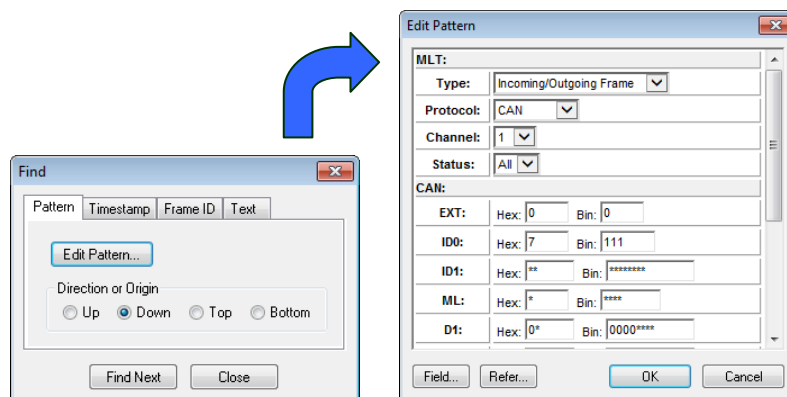# PRISM

Screenshots and Function Examples

Master Log channel

View list

Filtered Log channel

Setting tree

Traffic Graph channel

Analog Graph channel

Various other channels can also be incorporated.

General-purpose multifunctional comprehensive testing environment realizing common operability
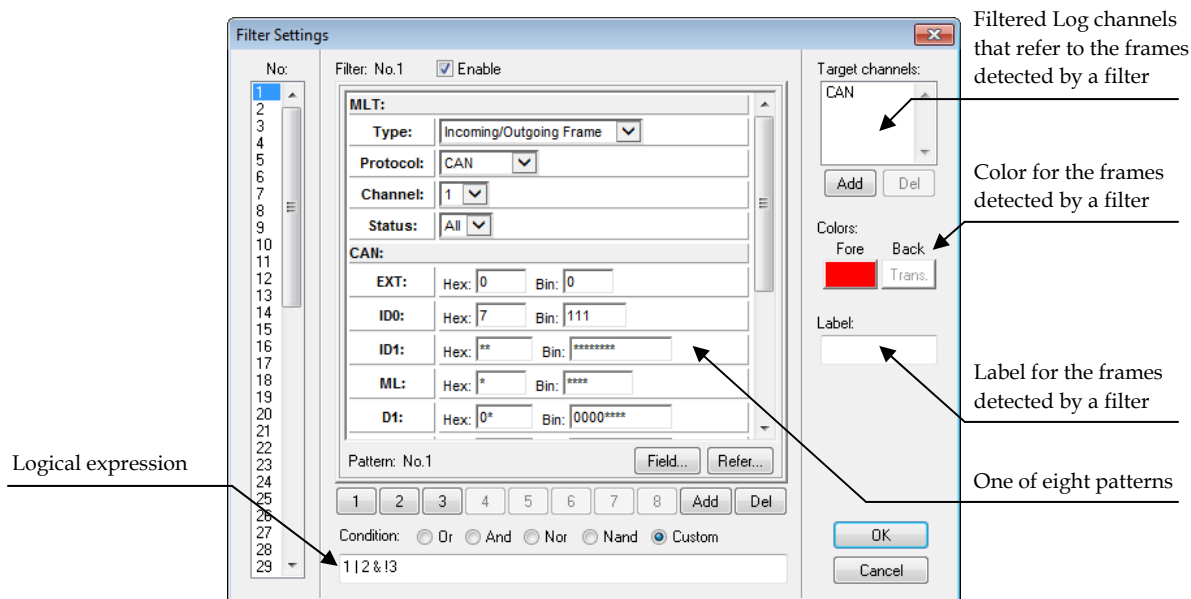
Frame ID   Time   Protocol   Frame data
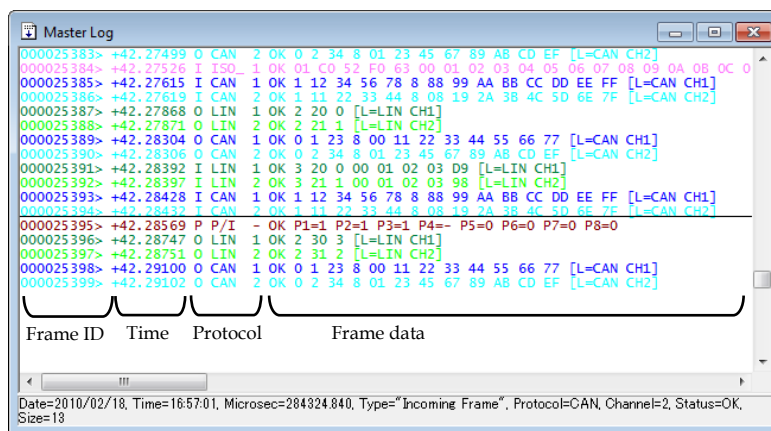
Master Log channel, referring to all frames in a log

The items to be displayed can be selected from the settings of "Frame Display". Date, time, microseconds, filter label, database, and other items can be displayed in addition to the items shown in this figure. Each item can also be displayed as comma-separated.

Filtered Log channels can also be used to display frames in the same way. They only refer to filtered frames, using related filters.

Search function to find a specified frame

Filtered Log channels that refer to the frames detected by a filter

Color for the frames detected by a filter

Label for the frames detected by a filter

One of eight patterns

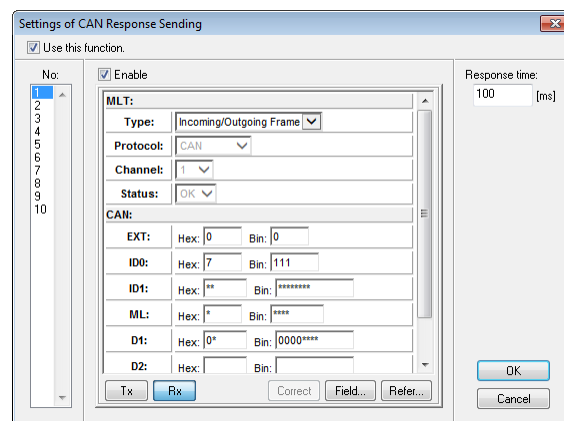Logical expression

Filter function including 64 filters consisting of 8 patterns and a logical expression
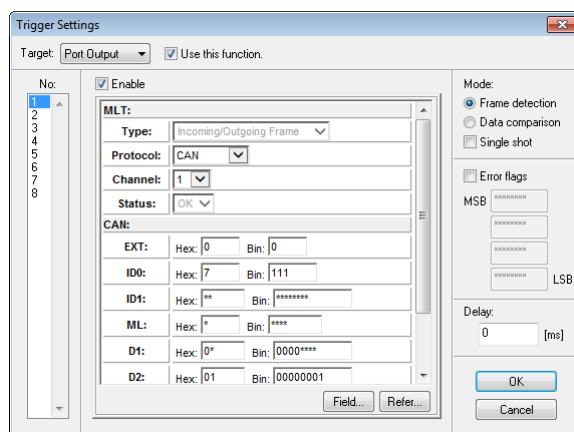
Trigger function to raise trigger events on the port input/output when detecting specified frames
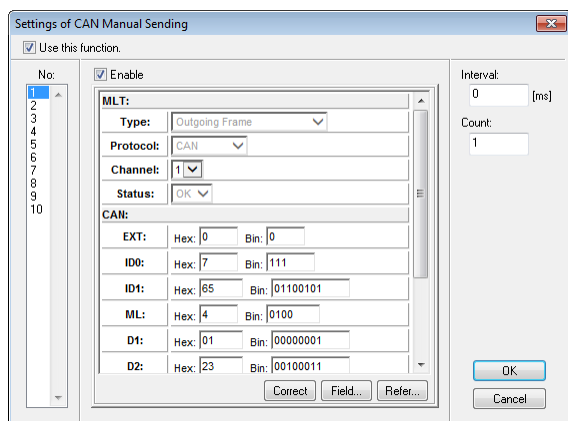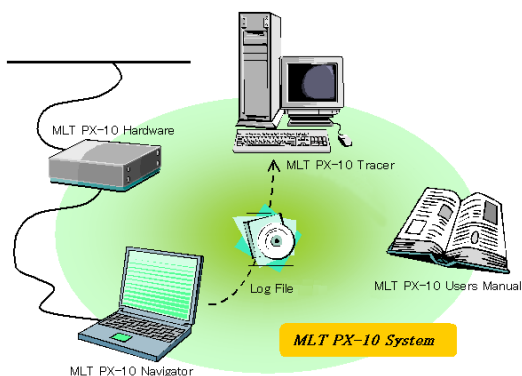

Manual sending function to send registered frames by key operation or mouse operation

Response sending function to send registered frames in response to specified frames automatically

Main Components of the MLT PX-10

MLT PX-10 Navigator	The software of the MLT PX-10. It controls the MLT PX-10 Hardware and generates log files. It runs on Windows to perform logging, testing, simulation, etc. In the stand-alone operation mode, it makes preliminary settings necessary for the stand-alone operation.
MLT PX-10 Hardware	The equipment of the MLT PX-10. It has the function of monitoring frames sent through networks and the function of sending frames instead of real nodes. In the normal mode, it is controlled by the MLT PX-10 Navigator. In the stand-alone operation mode, it runs without a PC, with its settings stored in its flash memory. Even during the stand-alone operation, a user module, written in pScript, can be executed.
MLT PX-10 Users Manual	The users manual of the MLT PX-10. It explains the whole system of the MLT PX-10. It contains the instructions for installation, connection, and various settings, and also contains concrete examples of how to use.

Three main components forming the system of the MLT PX-10
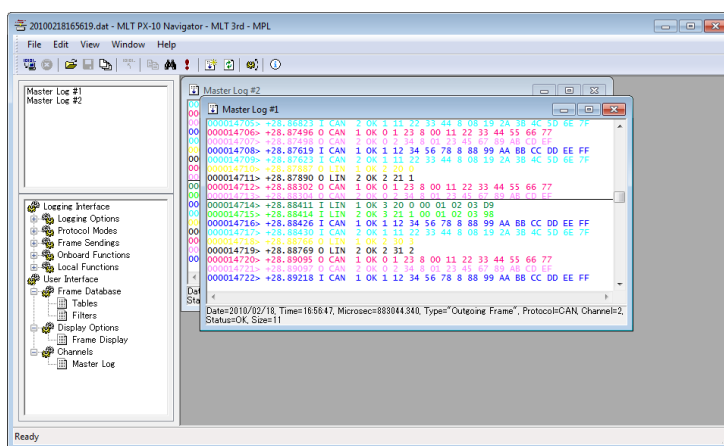
MLT PX-10 Navigator: Comprehensive testing environment software incorporating strong filter function, database function, etc.
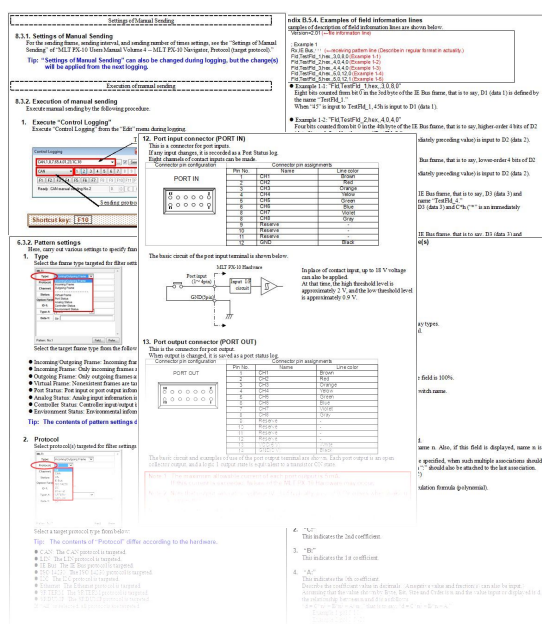
MLT PX-10 Users Manual: Includes detailed descriptions and concrete examples of how to use.

MLT PX-10 Hardware: Generates high-accuracy timestamps in microseconds. (in 10 nanoseconds for port input)
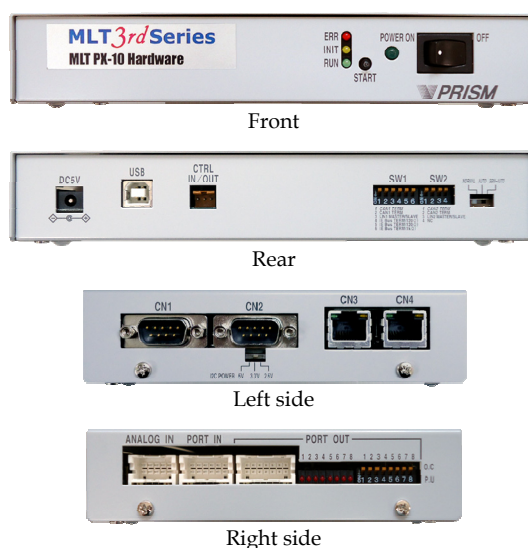
Note: The appearance is dependent on the hardware model. This photo shows the model 4C2.

Navigator User Modules

You can write a user-defined program that runs on the MLT PX-10 Navigator—this is called a Navigator user module. Navigator user modules allow sending of, response to, and display of any frame, and easy user operation with GUI components. Navigator user modules are written in pScript, which is our originally designed and developed script language. Because its grammar is simple, descriptions can be made easily without programming experience.
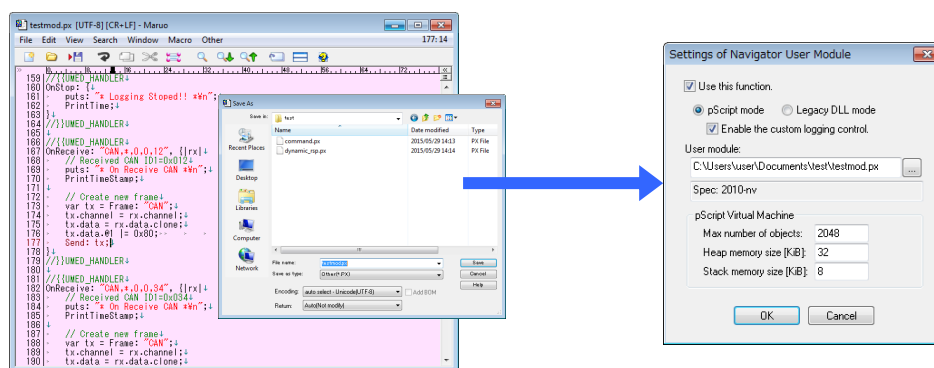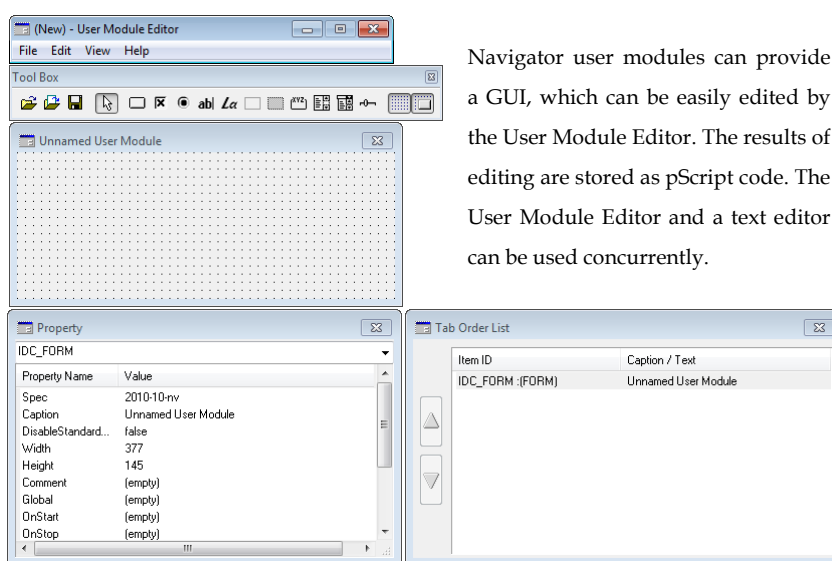
Navigator user modules can be created by any text editor. All you need to do to run a Navigator user module is enter its path name into a field on a dialog box. No compilation is required because it is a program written in the script language pScript.

Navigator user modules can provide a GUI, which can be easily edited by the User Module Editor. The results of editing are stored as pScript code. The User Module Editor and a text editor can be used concurrently.

User Module Editor

[1] Select a GUI component from the tool box.

[2] Put it on the work window.

[3] Set its details on the property window. Then, describe the action that will be taken when it is clicked, focused, etc., writing pScript code on the spot.
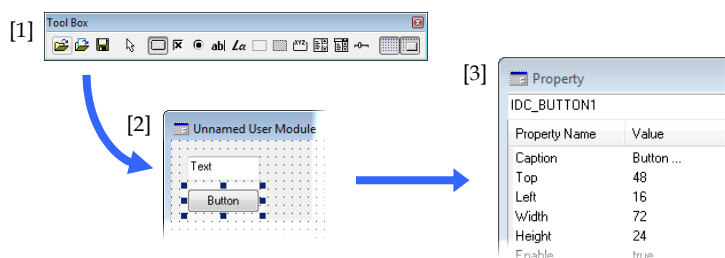
How to use the User Module Editor

Hardware User Modules

You can write a user-defined program that runs on the MLT PX-10 Hardware—this is called a Hardware user module. Hardware user modules allow sending of and response to any frame. Hardware user modules are written in pScript.

Note: Hardware user modules can be created only by a text editor.

Examples of Using User Modules

Note: These examples are applicable to both Navigator user modules and Hardware user modules except for Example 5.
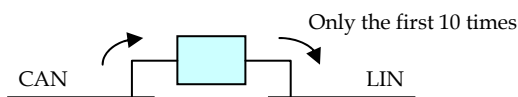Example 5 is only applicable to Navigator user modules.

Example 1: When a CAN frame with ID0 = 1 and ID1 = 0x24 is received, a LIN frame with ID = 0x12 and D1–D3 = 0xABCDEF is sent.
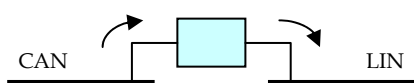

```
OnReceive: "CAN,1,0,1,24", {
  Send: "LIN,1,0,12,2,AB,CD,EF,96";
}
```
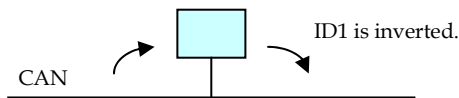

Example 2: Only the first 10 times that a CAN frame with ID0 = 1 and ID1 = 0x25 is received, the same LIN frame as above is sent.

Only the first 10 times

```
var count = 0;
OnReceive: "CAN,1,0,1,25", {
  (count < 10).if_true: {
    count += 1;
    Send: "LIN,1,0,12,2,AB,CD,EF,96";
  }
}
```

Example 3: CAN frames with specific ID0–ID1 values are sent again, with their ID1 inverted.

ID1 is inverted.

```
OnReceive: "CAN,1,0,1,3*", {|rx|
  (rx.data.size >= 2).if_true: {
    var tx = Frame: "CAN,1";
    tx.data = rx.data.clone;
    tx.data.@1 ^= 0xFF; // ID1
    Send: tx;
  }
}
```

Example 4: The number of specific frames is counted and displayed.
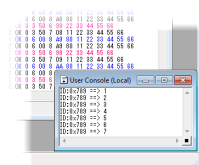
Character strings can be displayed on a user console.

```
var count_789 = 0;
OnReceive: "CAN,1,0,7,89", {
  count_789 += 1;
  printf: "ID:0x789 ==> %d\n", count_789;
}
```

Example 5: Response to specific frames is started when a button is clicked.
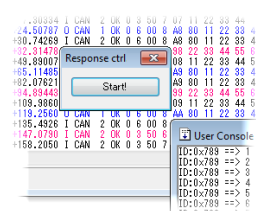
Navigator user modules can provide a GUI, which can be easily edited by the User Module Editor.

```
InitDialog: 130, 75, "Response ctrl";
const IDC_BUTTON1 = 1001;
AddButton: IDC_BUTTON1,
        10, 10, 104, 24, 0, 0, "Start!";
var enable = false;
OnClick: IDC_BUTTON1, {
  enable = true;
}
OnReceive: "CAN,1,0,1,26", {
  enable.if_true: {
    Send: "LIN,1,0,12,2,AB,CD,EF,96";
  }
}
```

Tracer User Modules

The log files of the MLT PX-10 Navigator can be analyzed by the MLT PX-10 Tracer. You can write a user-defined program that contains analytical procedures for them—this is called a Tracer user module. Tracer user modules are written in pScript.

Note: Tracer user modules can be created only by a text editor.

How to use the MLT PX-10 Tracer

    (1)   Select log files you want to analyze, and add them to the source list.

    (2)   Specify the destination folder in which results are to be stored.

    (3)   Write a new Tracer user module on the spot, or bring an existing Tracer user module. Then, specify its path name.

    (4)   Click the "Start" button.

Examples of using Tracer user modules
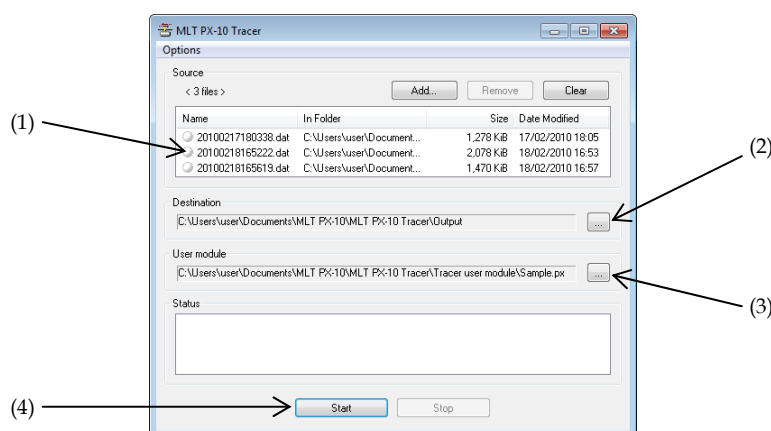
If you want to count the number of specific CAN frames, you can write this code:

```
var count = 0;
OnReceive: "CAN,1,0,1,24", {
    count += 1;
}
OnStop: {
    printf: "ID:0x124 => %d\n", count;
}
```

This increments the variable "count" when a CAN frame with ID0 = 1 and ID1 = 0x24 is detected.

When all frames have passed, the value of "count" is output. This is done for each log file.

As just illustrated, analyzing log files with a Tracer user module is easy. Suppose that the same analysis is performed in some other language, such as C/C++. Then, such an analysis requires the following processes: reading frames one by one from log files, checking whether they match specific patterns, and writing results to previously opened output files. These are all troublesome.

Tracer user modules can also be applied to many other cases. For example, you can consider:

• Checking whether, for each log file in "D:\Network Debugging\", a diagnostic frame indicating an error is included in a log, and, if so, outputting a message such as "an error detected" to each output file, or

• Checking whether, for each log file in "E:\Event Monitoring\", a certain type of frame was sent periodically within a specified interval, and, if not so, outputting a message "abnormal transmission period".

Stand-alone Operation Mode

The MLT PX-10 Hardware can run without a PC. This is stand-alone operation, which is achieved by storing various settings such as protocol settings, sending settings, and input/output settings into the flash memory of the MLT PX-10 Hardware. Even during the stand-alone operation, a Hardware user module can be executed because it is also stored in the flash memory.

How to activate the stand-alone operation

(1) In the normal mode, configure all the settings, using the MLT PX-10 Navigator, in order to apply them also to your stand-alone use. This may be done through trial and error, requiring logging and adjustment several times.

(2) Choose the option illustrated below to make the flash memory writeable, and then start logging. Writing to the flash memory will start. Wait until the writing process is completed.
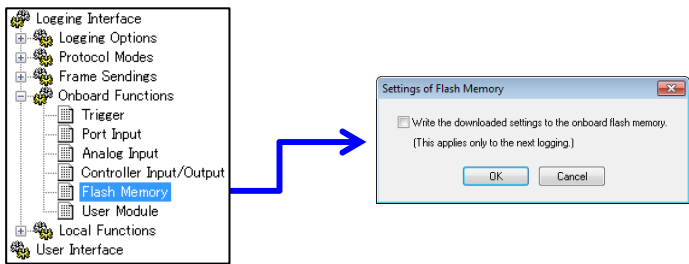
(3) Power off the MLT PX-10 Hardware, and then move the mode switch from the "NORMAL" setting to the "AUTO" setting. Power it on again. It will start in the stand-alone operation mode—that is, it will run without a PC.

System Requirements

OS ···················· Microsoft Windows 7 or Windows 10
CPU ·················· Multi-core 32- or 64-bit processor
RAM ················· 1 GiB or more for the 32-bit processor; 2 GiB or more for the 64-bit processor
Display ·············· 1024 × 768 pixels or more, with 256 colors or more (16-bit color recommended)
HDD ················· 60 MiB or more of available disk space
Port/Drive ·········· USB port; CD-ROM drive (for installation)
Others ··············· Pointing device such as a mouse; PDF reader software (for users manual)

Contents of This Product

MLT PX-10 Hardware ······························1
MLT PX-10 Installation CD ······················1
AC adapter ·····································1
USB cable ·····································1
Network interface cable ·······················0 to 3
    (dependent on the hardware model) D-sub 9pin connector
Analog input cable ····························1
Port input cable ······························1
Port output cable ·····························1
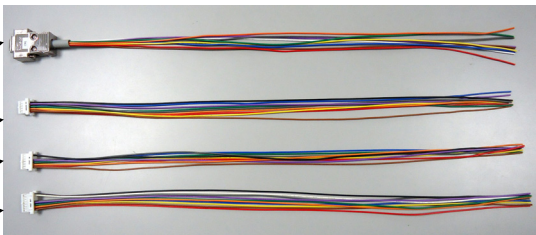
Cable length About 50 cm, Cable type PVC, AWG size 22

Licensing Policy

The MLT PX-10 Navigator which can be used simultaneously per one product comes with one license.

However, if it is not being used simultaneously, the MLT PX-10 Navigator can be installed on any number of PCs you have.

Therefore, there is no mechanism such as license locking.

When more than one person intends to use the MLT PX-10 Navigator simultaneously to analyze communication logs, etc., please purchase a separate license for the necessary number of PCs.

Model Selection

Currently, the following models of the MLT PX-10 are available.

Model	CAN	LIN	ISO 14230	IE Bus	I2C	SRTERM	SRDUMP	Ethernet	CXPI
4C1CX1	1								1
4C1IE1	1			1					
4C1IS1	1		1						
4C1L1	1	1							
4C1L1CX1	1	1							1
4C1L1IC1	1	1			1				
4C1L1IE1	1	1		1					
4C1L1IS1	1	1	1						
4C1L2	1	2							
4C2	2								
4C2CX2	2								2
4C2E2	2							2	
4C2IC1	2				1				
4C2IE1	2			1					
4C2IS1	2		1						
4C2L1	2	1							
4C2L1IS1	2	1	1						
4C2L2	2	2							
4C2L2E2	2	2						2	
4C2L2IE1	2	2		1					
4C2L2IS1	2	2	1						
4C2SD4	2					x	4 − x		
4CX2									2
4E2								2	
4IC1					1				
4IE1				1					
4IE1IC1				1	1				
4IE1IC1SD4				1	1	x	4 − x		
4L1CX1		1							1
4L1IS1		1	1						
4L2		2							
4L2IS1		2	1						
4SD4						x	4 − x		

*   The numbers above show the number of supported networks for each model and each protocol. The blanks mean "not supported". The variable x ranges from 0 to 4, and can be specified by setting.

*   All the CAN-supported models above support only High Speed CAN, but neither Low Speed CAN nor Single Wire CAN.

SRTERM   There are several types of serial communications used for computer terminals. They, generally, send character strings terminated with a special character such as 0x0A or 0x0D. Since such communications have no generic name, we have called them all SRTERM.

SRDUMP   There are serial communications used for an information dump that sends fixed-size frames. For such uses, we have called such communications all SRDUMP.

Ethernet   Both 10BASE-T and 100BASE-TX are supported. Packets in each direction are logged separately, whether full-duplex or half-duplex.

CXPI   The official acronym for Clock Extension Peripheral Interface. Its protocol is defined in JASO D 015-3 as a part of an automobile standard.

Hardware Specifications

Models	Group A	Group B	Group C	Group D
Input and output	8 channels of port input, 8 channels of port output,			
	8 channels of analog input, and 1 channel of controller input/output			
Power supply Input voltage	DC 5 V			
Current consumption	290 mA (typ)	300 mA (typ)	350 mA (typ)	410 mA (typ)
AC adapter specifications	Input: AC 50 Hz to 60 Hz, 100 V to 240 V, 0.3 A / Output: DC 5 V, 2.3 A			
Operating temperature	5 °C to 40 °C with no condensation			
Storage temperature	−40 °C to 65 °C			
External dimensions	Approx. 138 mm long, 201 mm wide, and 36 mm high			
Main body weight	Approx. 390 g	Approx. 450 g	Approx. 440 g	

Group A: 4C1IE1, 4C1IS1, 4C1L1, 4C1L1IC1, 4C1L1IE1, 4C1L1IS1, 4C1L2, 4C2, 4C2IC1, 4C2IE1, 4C2IS1, 4C2L1, 4C2L1IS1, 4C2L2, 4C2L2IE1, 4C2L2IS1, 4IC1, 4IE1, 4IE1IC1, 4L1IS1, 4L2, 4L2IS1

Group B: 4C1CX1, 4C1L1CX1, 4C2CX2, 4CX2, 4L1CX1

Group C: 4C2E2, 4C2L2E2, 4E2

Group D: 4C2SD4, 4IE1IC1SD4, 4SD4

Global Distributor

Our products can be sold abroad only through a trading company, Hagiwara Electric Co., Ltd., described below, from which you can get more detailed information about the products.

Company: Hagiwara Electric Co., Ltd.

Phone: +81-52-931-3241

Sales Rep: Yoshimi

E-mail: yoshimi@hagiwara.co.jp

Address: 2-3-3 Higashisakura, Higashi-ku, Nagoya-shi, Aichi 461-8520, Japan

About Our Company

Our company is located in Japan. We have been developing the MLT series since 1999.

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Address: 1-10-17 Konan-cho, Fukuyama-shi, Hiroshima 720-0814, Japan

Website: http://www.prism-arts.co.jp/

Visit our website. On its product page, the latest version of the catalog is available.

Note: The contents of this catalog are subject to change without notice. When ordering, obtain the latest information from the website of PRISM Co., Ltd.