MODEL-1883

Universal PROM Programmer
Operation　Manual

Minato Electronics Inc
The first Edition Mar 2013

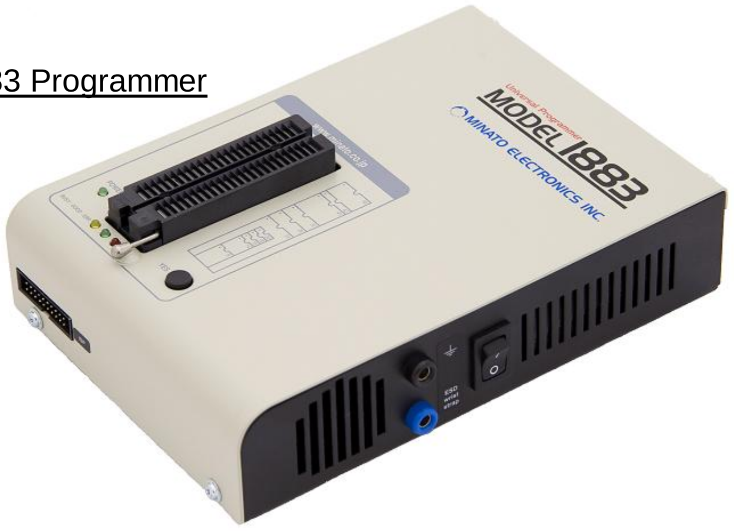
M1883EG-102A 201303.doc

MINATO ELECTRONICS INC

M1883 Programmer Confirmation of Accessories

When unpacking the package received from us, check if all the following items necessary for M-1883 had been included. If any item is missing or damaged, please contact our distributor or our sales office in your district.

M1883 Programmer



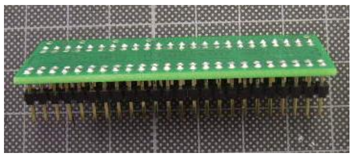
CD－ROM

・M1883 Setup software
（with USB driver、LPT driver）
・M1883 Operation Manual

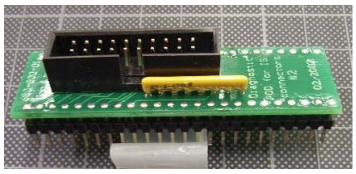
Power Code

USBCable

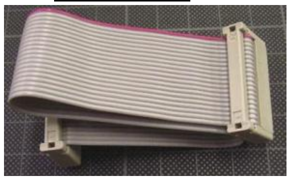
ZIP Socket POD1



ISP Connector POD2



ISP Cable



For ISP Check

For Safe Operation

Precaution for Safety

This operation manual includes safety indications here and there so that you can operate M1883 safety and correctly. For safe and correct operation of M1883 and also to prevent you, other operators or workers from injury and property form damage, the following pictographs are used to explain these safety indications.
Before reading this manual, fully understand these picotorgaphs and the meanings. Keep this manual at hand refer to it as occasion arises.

Explanation of Pictrographs

⚠ WARNING	Indicates a potential hazardous situation in which the operator would be killed or seriously injured unless this precaution is observed.
⚠ CAUTION	Indicates a potential situation in which the operator would be injured or property would be damaged unless this precaution is observed.

⚠ WARNING

Compulsion	When operating this unit, be sure to follow warnings and cautionary instructions given by Minato Electronics Inc.
Do Not Dissassemble	Do not disassemble or modify this unit. A fire may start or you may get and electric shock.
Unplug Power Cord	When finding a smoke,feeling an abnormal smell or hearing an abnormal sound, Pull out the power plug immediately from the AC plug receptacle. If keep operating, a fire may start or you may get an electric shock owing to short-circuit.
Unplug Power Cord	If dropped this unit or given a strong shock to the unit, pull out the power plug immediately from the AC plug receptacle. If keep operating, a fire may start or you may get an electric shock owing to short-circuit. Consult with our repair window.
Unplug Power Cord	If any liquid or foreign matter enters this unit, pull out the power plug immediately from the AC plug receptacle. If keep operating, a fire may start or you may get an electric shock owing to short-circuit. Consult with our repair window.

WARRNING

This unit shall be operated by an operator who has fully understood the operation manual of M1883.

Miss operation may damage this unit and other devices.

Compulsion

Before touching this unit, be sure to touch nearby large metal and remove static electricity from your body so that this unit is not damaged by static electricity.

Static electricity may damage this unit and other devices.

Compulsion

Clean the unit surface, the device socket and the air filter.

Operation without removing dusts from them will probably result in a fire or a trouble. Try to clean them periodically.

Compulsion

Check the pass/fail judgement not only LED of programmer but also

Check sum on display of PC.

Compulsion

Attached AC cable is only used for Japan.
You need prepare for another suitable cable in your country.

Compulsion

Content

Chapter 2　M1883 Control Software((PG4UW) Operation Manual

For Users

We thank you for your purchase of our M1883.

The guarantee period of this unit is for one year after deliverly to you.
Even during the guarantee period, we exclude damages as a result of natural disaster, Misoperation, modification or change of this unit by user and wear of the socket adapter from the guarantee.

Also, please note that we are not obliged to refund for a damaged P-ROM of the programmer due to malfunciton.

In case of anything unclear to you, please contact Mianto or Minato distributor.
Specifications are subject to change without prior for futher improvent.

How to use this manual

This manual explains how to install the control program and how to use your programmer. It is assumed that the user has some experience with PCs and installation of software. Once you have installed the control program we recommend you consult the context sensitive HELP within the control program rather than the printed User manual. Revisions are implemented in the context sensitive help before the printed User manual.

Display

Function name using control software is displayed by thick character.

File->Load、**File->Save**、**Buffer ->Display/Edit**、

Tool button

Load 、 **Save** 、 **Edit** 、 **Select** 、. . . .

Function key used on key board

<F1>、<F5>、etc.

Explanation of word

Device	:any kind of programmable integrated circuits or programmable devices
ZIF socket	:Zero Insertion Force socket used for insertion of target device
Buffer	:part of memory or disk, used for temporary data storage
Printer port	:type of PC port (parallel), which is primarily dedicated for printer connection.
USB port	:type of PC port (serial), which is dedicated for connecting portable and peripheral devices.
HEX data format	:format of data file, which may be read with standard text viewers; e.g. byte 5AH is stored as characters '5' and 'A', which mean bytes 35H and 41H. One line of this HEX file (one record) contains start address and data bytes. All records are secured with checksum.

Chapter 1

Outline of programmer Specification & Installration

Outline of M1883

M1883 is a fast universal USB/LPT interfaced universal programmer and logic IC tester with 48 powerful pindrivers. Using build-in ISP connector the programmer is able to program ISP capable chips in-circuit.
This design allows easily add new devices to the device list.

M1883 is a true universal and a true low cost programmer, providing one of the best "value for money" in today's market.

M1883 work with almost any IBM PC Pentium compatible or higher, portable or desktop personal computers. Programmers use the USB port or parallel (printer) port of PC.

Programmers function flawlessly on Windows operating system (see section PC requirement).

Programmers are driven by an **easy-to-use, control program** with pull-down menus, hot keys and online help.

Please check component before you install control software and operate programmer.
In case there is missing item and defective item, please contact our sales office and local distributor.

List of component

（1）	M1883 programmer	1set
（2）	Electric cable	1pc
（3）	USB cable (1.5m)	1pc
（4）	Pod for self check of ZIF socket	1pc
（5）	Pod for self check of ISP connector	1pc
（6）	Flat cable for ISP check	1pc
（7）	CD ROM for control software	1pc

Caution：Attached AC cable is used for domestic.
You need to prepare for AC suitable cable in your country.

PC requirements

Minimam PC requirements

・OS	Microsoft Windows® XP
・CPU	Pentiam 4
・RAM	512MB
・Hard DisK	200MB
・Interface	USB1．1 or Printer port[PP mode]
・CD Drive	CD－ROM Reader

Reommmend PC requirements

・OS	Microsoft Windows® 7
・CPU	Core 2 Duo
・RAM	1GB or more
・Hard Disk	Useful area 1GB or more
・Interface	USB2．0 or Printer port[ECP、EPP mode]
・CD Drive	CD－ROM Reader

Feature of M1883 programmer

M1883 is a very fast universal USB/LPT interfaced universal programmer built to meet the strong demand of the small manufacturing and developer's community for the fast and reliable universal programmer.

M1883 support all kinds of types and silicon technologies of today and tomorrow programmable devices without family-specific module. You have freedom to choose the optimal device for your design. Using built-in in-circuit serial programming (**ISP**) connector, the programmer is able to program ISP capable chips in circuit.

M1883 isn't only programmer, but also **tester** of TTL/CMOS logic ICs and memories. Furthermore, it allows generating user-definable test pattern sequences.

M1883 provides very competitive price coupled with excellent hardware design for reliable programming. It is probably **best "value for money"** programmer in this class.

M1883 provides **very fast programming** due to high-speed FPGA driven hardware and execution of time-critical routines inside of the programmer. It is at least fast than competitors in this category, for many chips much faster than most competitors. As a result, when used in production this one-socket-programmer waits for an operator, and not the other way round.

M1883 interfaces with the IBM PC Pentium compatible or higher, portable or desktop personal computers through USB (2.0/1.1) port or any standard parallel (printer) port. Programmer can utilize power of both USB high-speed port and IEEE1284 (ECP/EPP) high-speed parallel port. Support of both USB/LPT port connections gives you the choice to connect the M1883 programmer to any PC, from latest notebook to older desktop without USB port.

M1883 provides a banana jack for ESD wrist straps connection to easy-to-implement the ESD protection control and also other banana jack for earth wire.

M1883 has a FPGA based totally reconfigurable 48 powerful TTL pindrivers, where provide H/L/pull_up/pull_down and read capability for each pin of socket. Advanced pindrivers incorporate **high-quality high-speed** circuitry to deliver signals without overshoot or ground bounce for all supported devices. Improved pindrivers operate down to 1.8V so you'll be ready to program the full range of today's advanced low-voltage devices.

M1883 performs device **insertion test** (wrong or backward position) and **contact check** (poor contact pin-to-socket) before it programs each device. These capabilities, supported by **overcurrent protection** and **signature-byte check** help prevent chip damage due to operator error.

The selftest capability allows running diagnostic part of software to thoroughly check the health of the programmer.

Built-in **protection circuits** eliminate damage of programmer and/or programmed device due environment or operator failure. All the inputs of the M1883 programmer, including the

ZIF socket, ISP connector, connection to PC and power supply input, are **protected against ESD** up to 15kV.

M1883 programmer performs programming **verification** at the **marginal level** of supply voltage, which, obviously, improves programming yield, and guarantees long data retention.

Various **socket converters** are available to handle device in PLCC, SOIC, PSOP, SSOP, TSOP, TSSOP, TQFP, QFN (MLF), SDIP, BGA and other packages.

M1883 programmer is driven by an **easy-to-use** control program with pull-down menu, hot keys and on-line help. Selecting of device is performed by its class, by manufacturer or simply by typing a fragment of vendor name and/or part number.

Standard device-related commands (read, blank check, program, verify, erase) are boosted by some **test functions** (insertion test, signature-byte check), and some **special functions** (autoincrement, production mode - start immediately after insertion of chip into socket).

All known data formats are supported. Automatic file format detection and conversion during load of file.

The rich-featured **autoincrement function** enables to assign individual serial numbers to each programmed device - or simply increments a serial number, or the function enables to read serial numbers or any programmed device identification signatures from a file.

The software also provides a lot of information about programmed device. As a special, the **drawings of all available packages**, explanation of **chip labeling** (the meaning of prefixes and suffixes at the chips) for each supported chip are provided.

The software provide full information for ISP implementation: Description of ISP connector pins for currently selected chip, recommended target design around in-circuit programmed chip and other necessary information.

The **remote control** feature allows being PG4UW software flow controlled by other application – either using .BAT file commands or using DLL file. DLL file, examples (C/PAS/VBASIC/.NET) and manual are part of standard software delivery.

Jam files of JEDEC standard JESD-71 are interpreted by **Jam Player**. Jam files are generated by design software which is provided by manufacturer of respective programmable device. Chips are programmed in ZIF or through ISP connector (IEEE 1149.1 Joint Test Action Group (JTAG) interface).

VME files are interpreted by VME Player. VME file is a compressed binary variation of SVF file and contains high-level IEEE 1149.1 bus operations. VME files are generated by design software which is provided by manufacturer of respective programmable device. Chips are programmed in ZIF or through ISP connector (IEEE 1149.1 Joint Test Action Group (JTAG) interface).
Multiple devices are possible to program and test via JTAG chain: JTAG chain (ISP-Jam) or JTAG chain (ISP-VME).

Attaching of more **M1883** programmers to the same PC (through USB port) is achieved **powerful multiprogramming system**s, which support **as many chips, as are supported by M1883 programmer** and without obvious decreasing of **programming speed**. It is important to know, there is a concurrent multiprogramming - each programmer works independently and each programmer can program different chip, if necessary.

It is important to remember that in most cases new devices require **only a software update** due to the M1883 is truly universal programmer. With our prompt service you can have new devices can be added to the current list within hours!

Update for programmer

Why is it important to use the latest version of the control program?

- Semiconductor manufacturers continuously introduce new devices with new package types, manufactured by new technologies in order to support the need for flexibility, quality and speed in product design and manufacturing. To keep pace and to keep you up-to-date, we usually implement more than 500 new devices into the control program within a year.
- Furthermore, a typical programmable device undergoes several changes during its lifetime in an effort to maintain or to improve its technical characteristics and process yields. These changes often impact with the programming algorithms, which need to be upgraded (the programming algorithm is a set of instructions that tells the programmer how to program data into a particular target device). Using the newest algorithms in the programming process is the key to obtaining high quality results. In many cases, while the older algorithm will still program the device, they may not provide the level of data retention that would be possible with an optimal algorithm. Failure to not use the most current algorithm can decrease your programming yields (more improper programmed target devices), and may often increase programming times, or even affect the long term reliability of the programmed device.
- At least, we are making mistakes too... .

Our commitment is to implement support for these new or modified parts before or as soon as possible after their release, so that you can be sure that you are using latest and/or optimal programming algorithms that were created for this new device.

Quick start

Installation of programmer software

Run the installation program from the CD (Setup.exe) and follow the on-screen instructions.

Installation of programmer hardware

・connect the USB (or LPT) port of programmer to a USB (or printer) port of PC using supplied cable

・connect the connector of the power supply adapter to the programmer or turn on programmer by switch.

Run the control program

Double click on

After start, control program automatically scans all existing ports and searches for any connected M1883. Program is common for all the M1883, hence program will try to find M1883.

Menu **File** is used for source files manipulation, settings and viewing directory, changes drives, changes start and finish address of buffer for loading and saving files and loading and saving projects.

Menu **Buffer** is used for buffer manipulation, block operation, filling a part of buffer with string, erasing, checksum and of course editing and viewing with other items (find and replace string, printing...).

Menu **Device** is used for a work with selected programmable device: select, read, blank check, program, verify, erase and setting of programming process, serialization and associated file control.

Menu **Programmer** is used for work with programmer.

Menu **Options** is used to view and change various default settings.

Menu **Help** is used for view supported devices and programmers and information about program version.

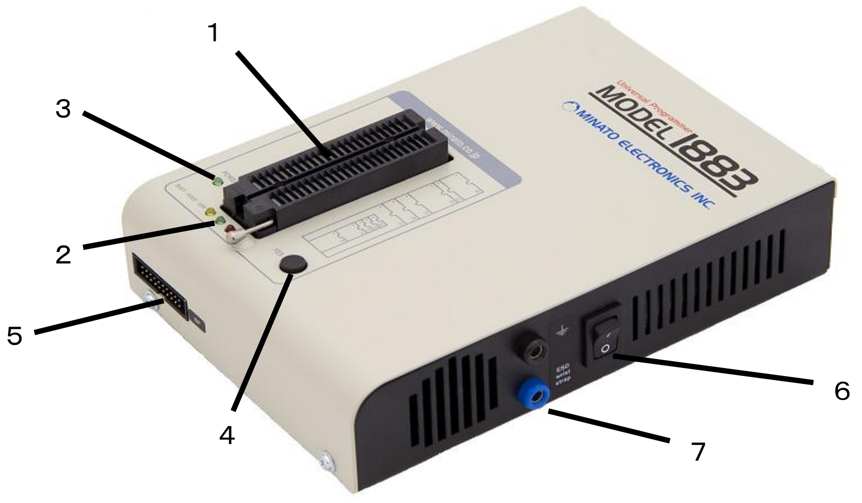
Programming a device

1. select device: - -> **Select** click on Select
2. load data into buffer:
   a) from file: - -> **Load** click on Load

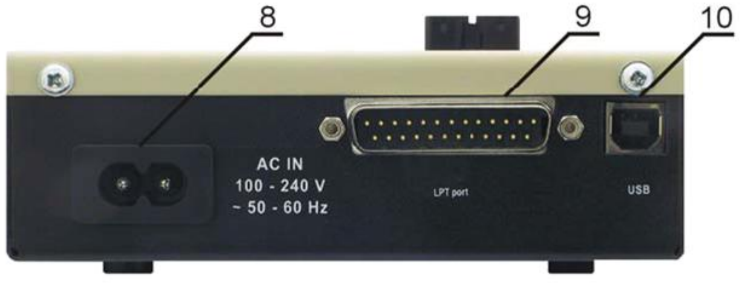
   b) from device: insert device to ZIF and - -> **Read** click on Read
3. insert target device to ZIF
4. check, if the device is blank: - -> **Blank** click on Blank
5. program device: - -> **Program** click on Program
6. additional verify of device: - -> **Verify** click on Verify

M1883 element

1) 48 pin ZIF socket
2) Work result LEDs
3) Power/sleep LED
4) YES! Button
5) ISP connector
6) Power switch
7) "GND" connector can be used for grounding of the programmer
   "ESD wrist strap" connector is place for attaching of ESD wrist strap



8) Power supply connector
9) LPT connector for PC ↔ M1883 communication cable
10) USB connector for PC ↔ M1883 communication cable



Connecting M1883 to the PC

Using USB port

In this case, order of connecting USB cable and power supply to programmer is irrelevant.

Using LPT port

Switch off PC and programmer. Insert the communication cable included with your M1883 programmer package to a free printer port on your PC. If your computer is equipped with only one printer port, substitute the programmer cable for the printer cable. Connect the opposite cable end to the programmer. Screw on both connectors to counter-connectors. This is very important. It may be uncomfortable to switch between printer cable and programmer cable, though it is not recommended to operate the M1883 programmer through a mechanical printer switch. Use of an electronic printer switch is impossible. But you can install a second multi-I/O in your computer, thus obtaining a supplementary printer port, says LPT2. So your printer may remain on LPT1 while the programmer on LPT2.

Switch on the PC.
Connect the connector “8” to a mains plug using attached cable. At this time all 'work result' LEDs (and 'POWER' LED) light up successive and then switch off. Once the POWER LED lights with low brightness then the M1883 programmer is ready to run.
Next run the control program for M1883.

Caution! If you don't want to switch off your PC when connecting the M1883 proceed as follows:

- **When connecting** the programmer to the PC: **FIRST** insert the **communications cable** and **THEN** the **power-supply connector.**
- **When disconnecting** the programmer from the PC: **FIRST** disconnect the **power-supply connector** and **THEN** the **communication cable**.

From M1883 point of view the connecting and disconnecting sequence is irrelevant. Protection circuits on all programmer inputs keep it safe. **But think of your PC please**.

Problems related to the M1883 ⇔ PC interconnection, and their removing

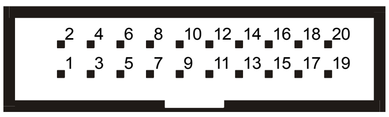
If you have any problems with M1883 PC interconnection, see section Common notes please.

In-system serial programming by M1883

For general definition, recommendation and direction about ISP see section **Common notes / ISP** please.

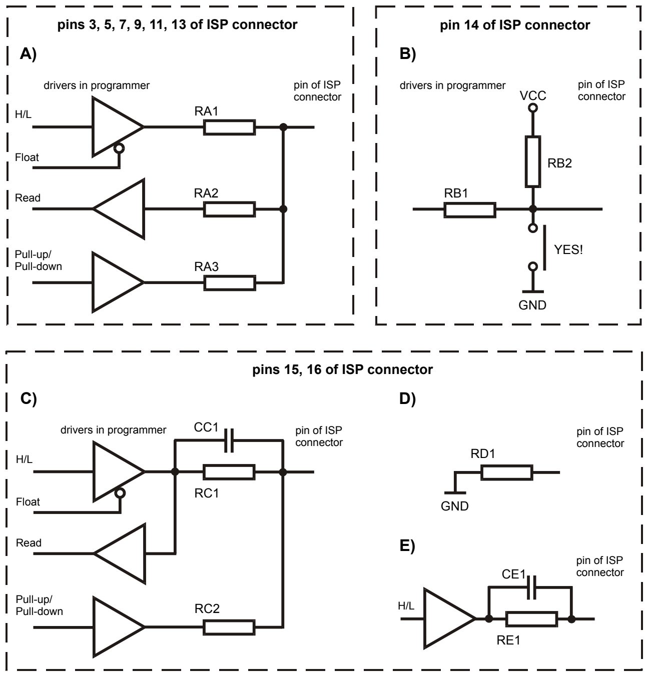
Description of ISP connector

As ISP connector is used 20 pins connector 2-1634689-0 from TE connectivity or other compatible connector.



Front view at ISP connector of programmer.

H/L/read driver



RA1 180R, RA2 1k3, RA3 22k,
RB1 10k, RB2 10k,
CC1 1n, RC1 1k3, RC2 22k,
RD1 22k, CE1 1n, RE1 1k3,

Comment to above picture:
picture C) Connection of pins 15 and 16 when are configured as logical signal needed for ISP programming
pictures D) E) When pins 15 and 16 are configured as status of LED OK and LED ERROR
picture D) before first action with desired ISP device
picture E) after first action with desired ISP device

Notes: When LED OK or LED ERROR ON (shine), this status is presented as logical H, level of H is 1,8V - 5V depend on H level of desired ISP device.
When LED OK or LED ERROR OFF (not shine), this status is presented as logical L, level of

L is 0V - 0,4V.
The above mentioned values are provided to understand (and also to exactly calculate) the value of resistors, which isolate (separate) the programmed chip and target system.

Specification of ISP connector pins depends on the device, which you want to program. You can find it in the control SW (PG4UW) for programmer, menu **Device / Device Info (Ctrl+F1)**. Be aware, the ISP programming way of respective device must be selected. It is indicated by (ISP) suffix after name of selected device.

Note: Pin no. 1 is signed by triangle scratch on ISP cable connectors.
As ISP connectors are used 20 pins connectors 09185207813 from Harting or other compatible connector.

M1883 ISP cable

Warnings:

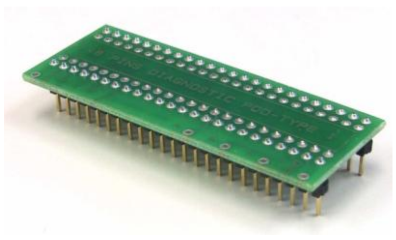
- When you use M1883 as ISP programmer, don't insert device to ZIF socket.
- When you program devices in ZIF socket, don't insert ISP cable to ISP connector.
- Use only attached ISP cable. When you use other ISP cable (other material, length**…), programmi**ng may occur unreliable.
- M1883 can supply programmed device (pin 1 of ISP connector) and target system (pin 5 of ISP connector) with limitation (see Technical specification / ISP connector).
- M1883 apply programming voltage to target device and checks his value (target system can modify programming voltage). If the programming voltage is different as expected, no action with target device will be executed.

Selftest and calibration check

If you feel that your programmer does not react according to your expectation, please run the programmer (ISP connector) selftest using Diagnostic POD (Diagnostic POD for ISP connectors #2), enclosed with the standard delivery package.

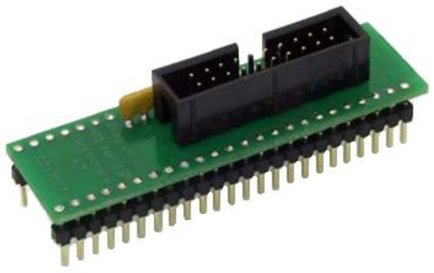
Selftest of programmer

- Insert **48 pins diagnostic POD - type I** into ZIF socket of the programmer. **48 pins diagnostic POD - type I** must be inserted as 48 pins device.
- Run selftest of programmer in PG4UW (Programmer / Selftest plus).



Selftest of ISP connector

- Insert **Diagnostic POD for ISP connectors #2** into ZIF socket of the programmer. **Diagnostic POD for ISP connectors #2** must be inserted as 48 pins device.
- Interconnect 20 pins connector of **Diagnostic POD for ISP connectors #2** with an ISP connector of the programmer with an ISP cable, included in delivery programmer package. Be sure that pins are interconnected properly (i.e. 1-1, 2-2, ..., 20-20).
- Run selftest of ISP connector in PG4UW (Programmer / Selftest ISP connector…).



Technical specification

HARDWARE

Base unit, DACs

- USB 2.0 high-speed compatible port, up to 480 Mb/s transfer rate
- FPGA based IEEE 1284 slave printer port, up to 1MB/s transfer rate (except BeeProg2C)
- on-board intelligence: powerful microprocessor and FPGA based state machine
- three D/A converters for VCCP, VPP1, and VPP2, controllable rise and fall time
- VCCP range 0..8V/1A
- VPP1, VPP2 range 0..26V/1A
- selftest capability
- protection against surge and ESD on power supply input, parallel port connection
- banana jack for ESD wrist straps connection
- banana jack for connection to ground

Socket, pindriver

- 48-pin DIL ZIF (Zero Insertion Force) socket accepts both 300/600 mil devices up to 48-pin
- pindrivers: 48 universal
- VCCP / VPP1 / VPP2 can be connected to each pin
- perfect ground for each pin
- FPGA based TTL driver provides H, L, CLK, pull-up, pull-down on all pindriver pins
- analog pindriver output level selectable from 1.8 V up to 26V
- current limitation, overcurrent shutdown, power failure shutdown
- ESD protection on each pin of socket (IEC1000-4-2: 15kV air, 8kV contact)
- continuity test: each pin is tested before every programming operation

ISP connector

- 20-pin male type with miss insertion lock
- 6 TTL pindrivers, provides H, L, CLK, pull-up, pull-down; level H selectable from 1.8V up to 5V to handle all (low-voltage including) devices.
- 1x VCCP voltage (range 2V..7V/100mA)
- programmed chip voltage (VCCP) with both source/sink capability and voltage sense
- and 1x VPP voltage (range 2V..25V/50mA)
- Target system power supply voltage (range 2V..6V/250mA)
- ESD protection on each pin of ISP connector (IEC1000-4-2: 15kV air, 8kV contact)
- two output signals, which indicate state of work result = LED OK and LED Error (active level: min 1.8V)
- input signal, switch YES! equivalent (active level: max 0.8V)

DEVICE SUPPORT

Programmer, in ZIF socket

- EPROM: NMOS/CMOS, 27xxx and 27Cxxx series, with 8/16 bit data width, full support for LV series
- EEPROM: NMOS/CMOS, 28xxx, 28Cxxx, 27EExxx series, with 8/16 bit data width
- Flash EPROM: 28Fxxx, 29Cxxx, 29Fxxx, 29BVxxx, 29LVxxx, 29Wxxx, 49Fxxx series, Samsung's K8Fxxxx, K8Cxxxx, K8Sxxxx, K8Pxxxx series, from 256Kbit to 1Gbit, with 8/16 bit data width, full support for LV series
- NAND FLASH: Samsung K9xxx, Hynix HY27xxx, Toshiba TC58xxx, Micron MT29Fxxx, Spansion S30Mxxx, Numonyx (ex STM) NANDxxx
- LBA-NAND: Toshiba THGVNxxx
- mDOC H3: SanDisk (ex M-Systems) SDED5xxx, SDED7xxx, MD2533xxx, MD2534xxx, Hynix HY23xxx
- Multi-chip devices: NAND+RAM, NOR+RAM, NOR+NOR+RAM, NAND+NOR+RAM
- FRAM: Ramtron
- MRAM: Everspin MRxxxxx8x
- NV RAM: Dallas DSxxx, SGS/Inmos MKxxx, SIMTEK STKxxx, XICOR 2xxx, ZMD U63x series
- Serial E(E)PROM: Serial E(E)PROM: 11LCxxx, 24Cxxx, 24Fxxx, 25Cxxx, 59Cxxx, 85xxx, 93Cxxx, NVM3060, MDAxxx series, full support for LV series, AT88SCxxx
- Serial Flash: standard SPI (25Pxxx, 25Fxxx, 25Lxxx, 25Bxxx, 25Txxx,25Sxxx, 25Vxxx, 25Uxxx, 25Wxxx, 45PExx), high performance Dual I/O SPI (25Dxxx, 25PXxxx), high performance Quad SPI (25Qxxx, 26Vxxx), DataFlash (AT45Dxxx, AT26Dxxx)
- Configuration (EE)PROM: XCFxxx, XC17xxxx, XC18Vxxx, EPCxxx, EPCSxxx, AT17xxx, AT18Fxxx, 37LVxx
- 1-Wire E(E)PROM: DS1xxx, DS2xxx
- PLD Altera: MAX 3000A, MAX 7000A, MAX 7000B, MAX 7000S, MAX7000AE, MAX II/G/Z
- PLD Lattice: ispGAL22V10x, ispLSI1xxx, ispLSI1xxxEA, ispLSI2xxx, ispLSI2xxxA, ispLSI2xxxE, ispLSI2xxxV, ispLSI2xxxVE, ispLSI2xxxVL, LC4xxxB/C/V/ZC/ZE, M4-xx/xx, M4A3-xx/xx, M4A5-xx/xx, M4LV-xx/xx, ispCLOCK, Power Manager/II, ProcessorPM
- PLD: Xilinx: XC9500, XC9500XL, XC9500XV, CoolRunner XPLA3, CoolRunner-II
- other PLD: SPLD/CPLD series: AMD, AMI, Atmel, Cypress, Gould, ICT, Lattice, National Semicond., Philips, STMicroelectronics, TI (TMS), Vantis, VLSI
- FPGA: Actel: ProASIC3, IGLOO, Fusion
- FPGA: Lattice: MachXO, LatticeXP, ispXPGA
- FPGA: Xilinx: Spartan-3AN
- Clocks: TI(TMS), Cypress
- Special chips: Atmel Tire Pressure Monitoring ATA6285N, ATA6286N, PWM controllers: Zilker Labs, Analog Devices, Gamma buffers: TI, Maxim ...
- Microcontrollers MCS51 series: 87Cxxx, 87LVxx, 89Cxxx, 89Sxxx, 89Fxxx, 89LVxxx, 89LSxxx, 89LPxxx, 89Exxx, 89Lxxx, all manufacturers,
- Philips LPC series
- Microcontrollers Intel 196 series: 87C196 KB/KC/KD/KT/KR/...
- Microcontrollers Atmel ARM. ARM7: AT91SAM7Sxx, AT91SAM7Lxx, AT91SAM7Xxx, AT91SAM7XCxx, AT91SAM7SExx series; ARM9: AT91SAM9xxx series; ARM Cortex-M3: AT91SAM3Uxxx series
- Microcontrollers Atmel AVR 8bit/16bit: AT90Sxxxx, AT90pwm, AT90can, AT90usb, ATtiny, ATmega, ATxmega series
- Microcontrollers Atmel AVR32: AT32UC3xxxx
- Microcontrollers Chipcon (TI): CC11xx, CC24xx, CC25xx series
- Microcontrollers Coreriver: Atom 1.0, MiDAS1.0, 1.1, 2.0, 2.1, 2.2, 3.0 series

- Serial E(E)PROM: IIC series, MW series, SPI series, KEELOQ series, PLD configuration memories, UNI/O series
- 1-Wire E(E)PROM: DS1xxx, DS2xxx
- Serial Flash: standard SPI (25xxx), DataFlash (AT45Dxxx, AT26Dxxx)
- Microcontrollers Atmel: AT89Sxxx, AT90pwm, AT90can, AT90usb, AT90Sxxxx, ATtiny, ATmega, ATxmega, AT89LSxxx, AT89LPxxx
- Microcontrollers Atmel AVR32: AT32UC3xxxx
- Microcontrollers Chipcon (TI): CC11xx, CC24xx, CC25xx series
- Microcontrollers Cypress: CY8C2xxxx
- Microcontrollers Elan: EM78Pxxx, EM6xxx series
- Microcontrollers EM Microelectronic: 4 and 8 bit series
- Microcontrollers Microchip PICmicro: PIC10xxx, PIC12xxx, PIC16xxx, PIC17xxx, PIC18xxx, PIC24xxx, dsPIC, PIC32xxx series
- Microcontrollers Mitsubishi: M16C
- Microcontrollers Motorola/Freescale: HC08 (both 5-wire, All-wire), HC11, HC12, HCS08, S12, S12X, MC56F, MCF52 series
- Microcontrollers Nordic Semiconductor: nRF24xxx
- Microcontrollers NEC: uPD7xxx series
- Microcontrollers Philips (NXP): LPC1xxx, LPC2xxx, LPCxx series, 89xxx series
- Microcontrollers Renesas: R8C/Tiny series
- Microcontrollers Realtek, M-Square
- Microcontrollers Scenix (Ubicom): SXxxx series
- Microcontrollers STM: ST7xxx, STR7xx, STR9xx, STM32Fxx, STM8A/S/L series
- Microcontrollers Silicon Laboratories(Cygnal): C8051 series
- Microcontrollers & Programmable System Memory STMicroelectronics: uPSD, PSD series
- Microcontrollers TI: MSP430 (both JTAG and BSL series), MSC12xxx series
- Microcontrollers ZILOG: Z8Fxxxx, Z8FMCxxxxx, Z16Fxxxx series, ZLF645x0xx
- Various PLD (also by Jam/VME/SVF/STAPL/... Player/JTAG support):
- Altera: MAX 3000A, MAX 7000A, MAX 7000B, MAX 7000S, MAX 9000, MAX II/G/Z
- Xilinx: XC9500, XC9500XL, XC9500XV, CoolRunner XPLA3, CoolRunner-II
- PLD Lattice: ispGAL22xV10x, ispLSI1xxxEA, ispLSI2xxxE, ispLSI2xxxV, ispLSI2xxxVE, ispLSI2xxxVL, M4-xx/xx, M4LV-xx/xx, M4A3-xx/xx, M4A5-xx/xx, LC4xxxB/C/V/ZC/ZE, ispCLOCK, Power Manager/II, ProcessorPM
- FPGA: Actel: ProASIC3, IGLOO, Fusion
- FPGA: Lattice: MachXO, LatticeXP, ispXPGA

Notes:

- Devices marked * are obsolete, programming with additional module
- For all supported devices see actual Device list on http://www.minato.co.jp/

I.C. Tester

- TTL type: 54,74 S/LS/ALS/H/HC/HCT series
- CMOS type: 4000, 4500 series
- static RAM: 6116.. 624000
- user definable test pattern generation

Package support

- support all devices in DIP with default socket
- package support includes DIP, SDIP, PLCC, JLCC, SOIC, SOP, PSOP, SSOP, TSOP, TSOPII, TSSOP, QFP, PQFP, TQFP, VQFP, QFN (MLF), SON, BGA, EBGA, FBGA, VFBGA, UBGA, FTBGA, LAP, CSP, SCSP etc.
- support devices in non-DIP packages up to 48 pins with universal adapters

- programmer is compatible with third-party adapterMicrocontrollers Cypress: CY7Cxxxxx, CY8Cxxxxx
- Microcontrollers ELAN: EM78Pxxx
- Microcontrollers Infineon(Siemens): XC800, C500, XC166, C166 series
- Microcontrollers MDT 1xxx and 2xxx series
- Microcontrollers Microchip PICmicro: PIC10xxx, PIC12xxx, PIC16xxx, PIC17Cxxx, PIC18xxx, PIC24xxx, dsPIC, PIC32xxx series
- Microcontrollers Motorola/Freescale: HC05, HC08, HC11, HC12, HCS08, RS08, S12, S12X, MC56F, MCF51, MCF52 series
- Microcontrollers Myson MTV2xx, 3xx, 4xx, 5xx, CS89xx series
- Microcontrollers National: COP8xxx series
- Microcontrollers NEC: uPD70Fxxx, uPD78Fxxx series
- Microcontrollers Novatek: NT68xxx series
- Microcontrollers Nuvoton (Winbond): N79xxx, W77xxx, W78xxx, W79xxx, W83xxx series
- Microcontrollers NXP ARM Cortex-M3: LPC13xx, LPC17xx series
- Microcontrollers Philips (NXP) UOC series: UOCIII, UOC-TOP, UOC-Fighter series
- Microcontrollers Philips (NXP) ARM7: LPC2xxx, PCD807xx, SAF7780xxx series
- Microcontrollers Scenix (Ubicom): SXxxx series
- Microcontrollers Renesas: R8C/Tiny series
- Microcontrollers SGS-Thomson: ST6xx, ST7xx, ST10xx, STR7xx series
- Microcontrollers SyncMOS: SM59xxx, SM73xxx, SM79xxx, SM89xxx series
- Microcontrollers & Programmable System Memory STMicroelectronics: uPSD, PSD series
- Microcontrollers STM: ST6xx, ST7xx, ST10xx, STR7xx, STR9xx, STM32Fxx, STM8A/S/L series
- Microcontrollers Silicon Laboratories(Cygnal): C8051 series
- Microcontrollers Texas Instruments: MSP430, MSC12xx series, TMS320F series
- Microcontrollers Texas Instruments (ex Luminary Micro): LM3Sxxx, LM3Sxxxx series
- Microcontrollers ZILOG: Z86/Z89xxx and Z8Fxxxx, Z8FMCxxxxx, Z16Fxxxx, ZGP323xxxxxx, ZLF645xxxxxxx, ZLP12840xxxxx, ZLP323xxxxxxx series
- Microcontrollers other: EM Microelectronic, Fujitsu, Goal Semiconductor, Hitachi, Holtek, Novatek, Macronix, Princeton, Winbond, Samsung, Toshiba, Mitsubishi, Realtek, M-Square, ASP, Coreriver, Gencore, EXODUS Microelectronic, Megawin, Syntek, Topro, TinyARM, VersaChips, SunplusIT, Nordic, M-Square, QIXIN, Signetic, Tekmos, Weltrend, Amic, Cyrod Technologies, Ember, Ramtron, Nordic Semiconductor, Samsung ... EPROM:
- NMOS/CMOS, 2708*
- PROM: AMD, Harris, National, Philips/Signetics, Tesla, TI
- Microcontrollers 48 series: 87x41, 87x42, 87x48, 87x49, 87x50 series
- Microcontrollers 51 series: 87xx

Programmer, through ISP connector

- s for non-DIP support

Programming speed

Device	Size [bits]	Operation	Time
H26M11002AAR (eMMC NAND Flash)	3C780000hx8 (8 Giga)	programming *1	480 sec
K8P6415UQB (parallel NOR Flash)	400100Hx16 (64 Mega)	programming and verify	13 sec
K9F1G08U0M (parallel NAND Flash)	8400000Hx8 (1 Giga)	programming and verify	122.7 sec

QB25F640S33 (serial Flash)	800200Hx8 (64 Mega)	programming and verify	30.7 sec
AT89C51RD2 (microcontroller)	10000Hx8	programming and verify	14.4 sec
PIC32MX360F512L (microcontroller)	80000Hx8	programming and verify	8.9 sec

Conditions: P4, 2,4GHz, 512 MB RAM, USB 2.0 HS, Windows XP

Device operations

- **standard:**
  - intelligent device selection by device type, manufacturer or typed fragment of part name
  - automatic ID-based selection of EPROM/Flash EPROM
  - blank check, read, verify
  - program
  - erase
  - configuration and security bit program
  - illegal bit test
  - checksum
  - interprete the Jam Standard Test and Programming Language (STAPL), JEDEC standard JESD-71
  - interprete the VME files compressed binary variation of SVF files
- **security**
  - insertion test, reverse insertion check
  - contact check
  - D byte check
- **special**
  - production mode (automatic start immediately after device insertion)
  - lot of serialization modes (more type of incremental modes, from-file mode, custom generator mode)
  - statistic
  - count-down mode

Buffer operations

- view/edit, find/replace
- fill/copy, move, byte swap, word/dword split
- checksum (byte, word)
- print

File load/save

- no download time because programmer is PC controlled
- automatic file type identification

Supported file formats

- unformatted (raw) binary
- HEX: Intel, Intel EXT, Motorola S-record, MOS, Exormax, Tektronix, ASCII-SPACE-HEX,, ASCII HEX
- Altera POF, JEDEC (ver. 3.0.A), e.g. from ABEL, CUPL, PALASM, TANGO PLD, OrCAD PLD, PLD Designer ISDATA, etc.
- JAM (JEDEC STAPL Format), JBC (Jam STAPL Byte Code), STAPL (STAPL File) JEDEC standard JESD-71
- VME (ispVME file VME2.0/VME3.0)
- SVF (Serial Vector Format revision E)
- STP (Actel STAPL file)

GENERAL

- operating voltage 100-250V AC
- power consumption max. 20W active, about 2W sleep
- dimensions 195x140x55 mm (7.7x5.5x2.2 inch)
- weight 0.9kg (1.98 lb)
- operating temperature 5°C ÷ 40°C (41°F ÷ 104°F)
- operating humidity 20%..80%, non condensing

Installation

The programmer package contains a CD with the control program, useful utilities and additional information. The permission to freely copy the content of the CD is granted in order to demonstrate how MINATO ELECTRONICS INC.'s programmers work.

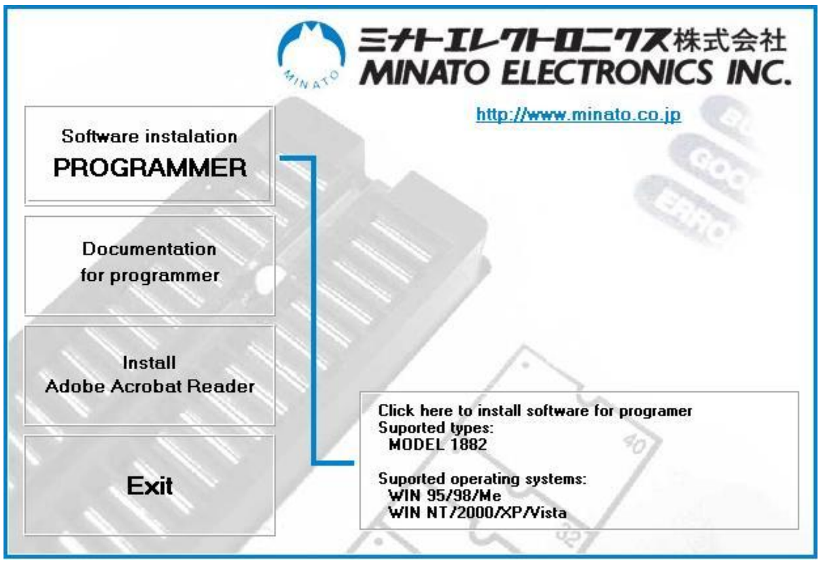
For programmers connected through USB (LPT) port, control program requires correctly installed USB driver

We recommend install software before connecting programmer to PC to avoid unwanted complication during installation.

Software setup

Insert delivered CD to your CD drive and install program starts automatically (if not, run setup.exe). Install program will guide you through the installation process and will do all the necessary steps before you can first run the control program.

Set up 1

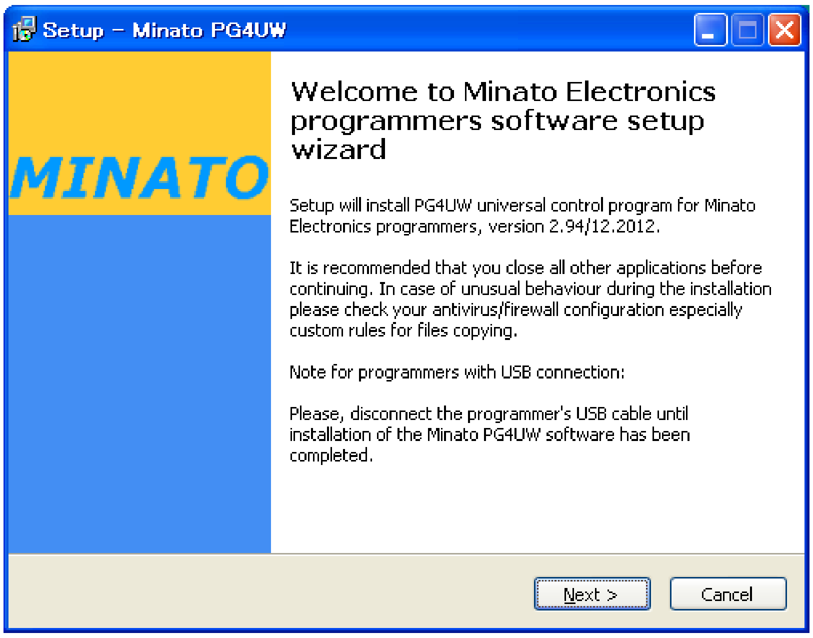


Click here to install software for programer
Suported types:
MODEL 1882

Suported operating systems:
WIN 95/98/Me
WIN NT/2000/XP/Vista

Click “Software installation PROGRAMMERS”button.

Set up 2



Welcome to Minato Electronics programmers software setup wizard

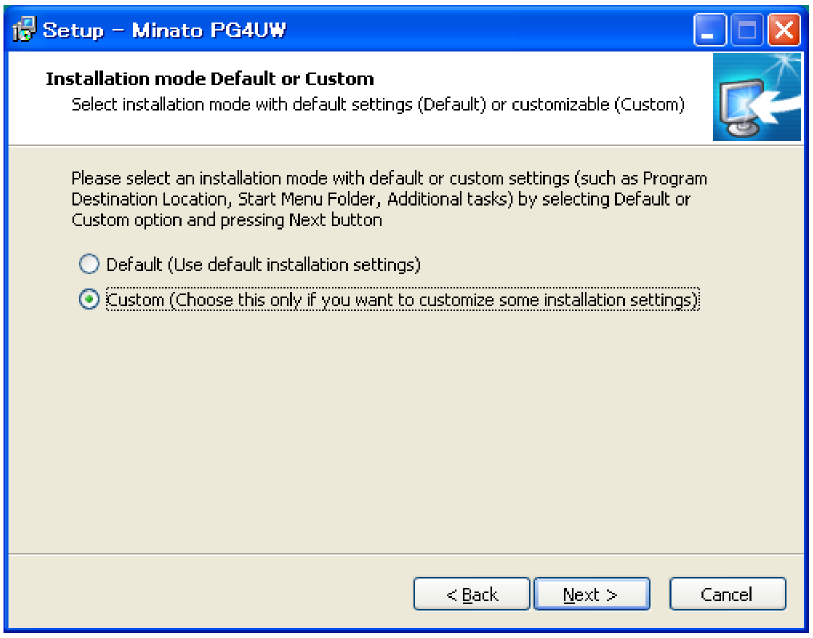
Setup will install PG4UW universal control program for Minato Electronics programmers, version 2.94/12.2012.

It is recommended that you close all other applications before continuing. In case of unusual behaviour during the installation please check your antivirus/firewall configuration especially custom rules for files copying.

Note for programmers with USB connection:

Please, disconnect the programmer's USB cable until installation of the Minato PG4UW software has been completed.

Click “Next” button.



Installation mode Default or Custom

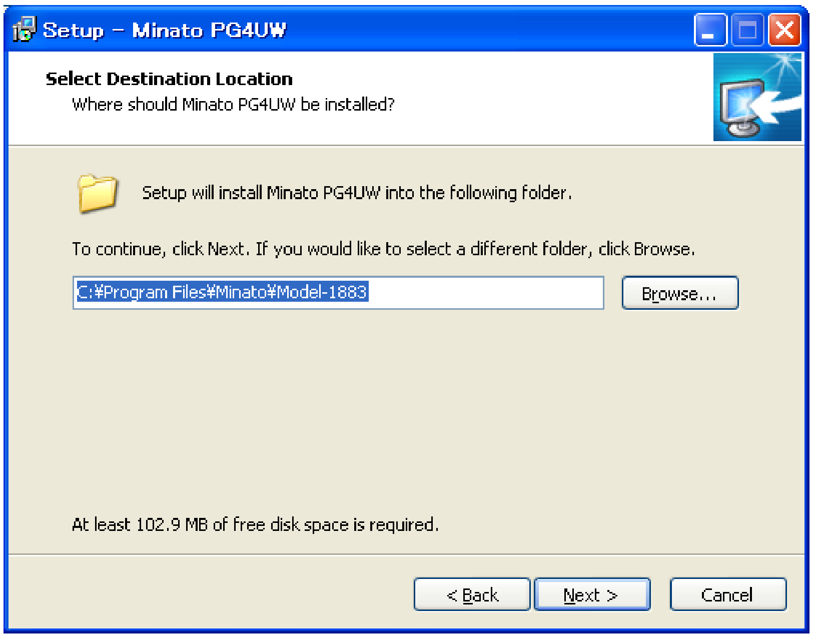
Select installation mode with default settings (Default) or customizable (Custom)

Please select an installation mode with default or custom settings (such as Program Destination Location, Start Menu Folder, Additional tasks) by selecting Default or Custom option and pressing Next button

○ Default (Use default installation settings)

● Custom (Choose this only if you want to customize some installation settings)

Set up 3


Setup - Minato PG4UW

Select Destination Location

Where should Minato PG4UW be installed?

Setup will install Minato PG4UW into the following folder.

To continue, click Next. If you would like to select a different folder, click Browse.

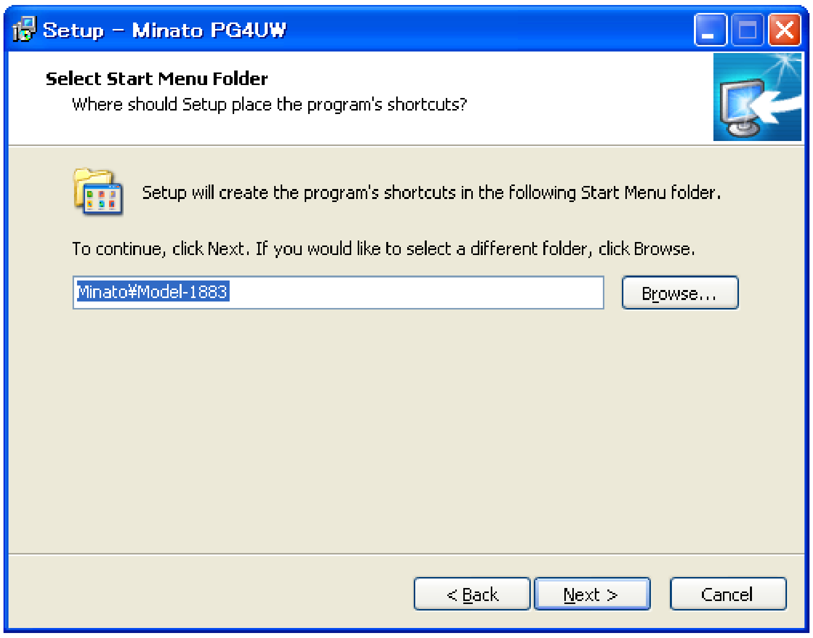
C:¥Program Files¥Minato¥Model-1883

At least 102.9 MB of free disk space is required.

For change default folder click on “Browse” button, select the destination folder.

Then click on “Next” button

Set up 4


Setup - Minato PG4UW

Select Start Menu Folder

Where should Setup place the program's shortcuts?

Setup will create the program's shortcuts in the following Start Menu folder.

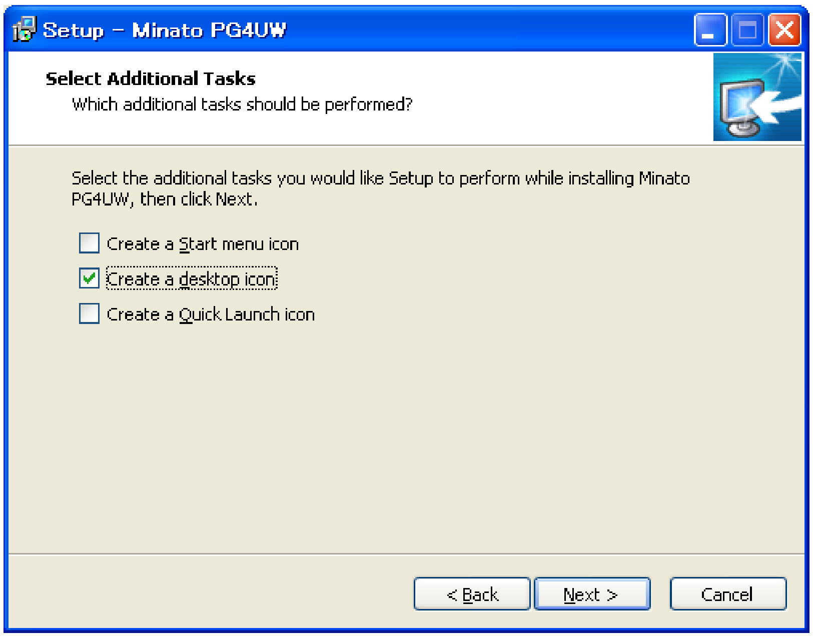
To continue, click Next. If you would like to select a different folder, click Browse.

Minato¥Model-1883

Select the destination folder.

Then click on “Next” button

Set up 5


Setup – Minato PG4UW

Select Additional Tasks

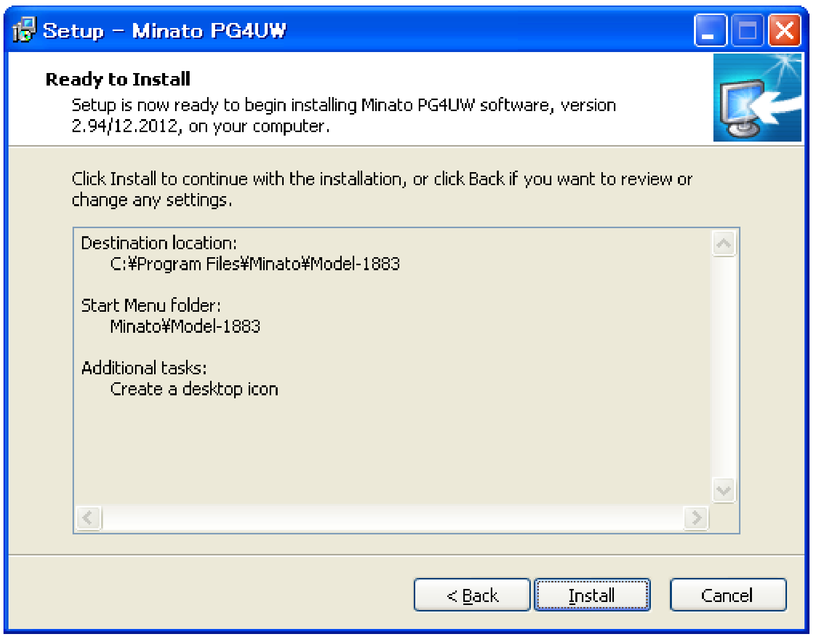
Which additional tasks should be performed?

Select the additional tasks you would like Setup to perform while installing Minato PG4UW, then click Next.

- [ ] Create a Start menu icon
- [x] Create a desktop icon
- [ ] Create a Quick Launch icon

Check if “Install Multiprogramming control support” is selected.
Change default setting, if you want. Then click on “Next” button

Set up 6


Setup – Minato PG4UW

Ready to Install

Setup is now ready to begin installing Minato PG4UW software, version 2.94/12.2012, on your computer.

Click Install to continue with the installation, or click Back if you want to review or change any settings.

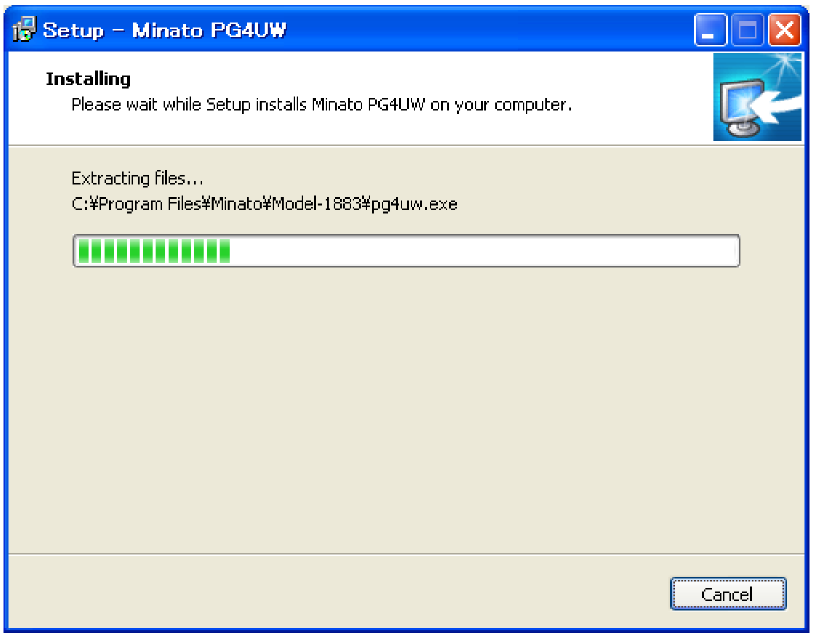
```
Destination location:
    C:¥Program Files¥Minato¥Model-1883

Start Menu folder:
    Minato¥Model-1883

Additional tasks:
    Create a desktop icon
```

Check your setting and then click on "Install" button

Set up 7


Setup – Minato PG4UW

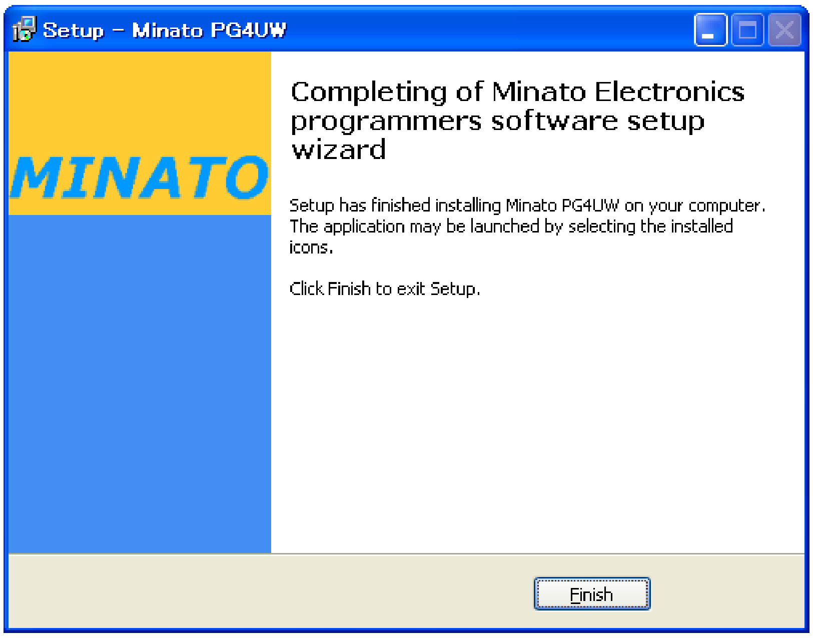
Installing

Please wait while Setup installs Minato PG4UW on your computer.

```
Extracting files...
C:¥Program Files¥Minato¥Model-1883¥pg4uw.exe
```

Installation process will start.

Set up 8


Setup – Minato PG4UW

Completing of Minato Electronics programmers software setup wizard

Setup has finished installing Minato PG4UW on your computer. The application may be launched by selecting the installed icons.

Click Finish to exit Setup.

If this message is expressed、Installation is finished.
Please click on Finish button.

Hardware setup

Warning: *Because of high programmer's communication traffic, we recommend to connect each programmer to separated USB 2.0 High speed controller (USB EHCI). Most of new PC motherboards have two or more EHCI controller integrated in chipset. If not, you can use PCI (PCI-E) USB add-on card (Renesas USB chipset is recommended). If the EHCI integrated in motherboard chipset is used, consult the motherboards manual or motherboard manufacturer tech support for USB ports mapping so you will be able connect each programmer to separated EHCI. In generally, we also recommend connect the programmers directly to PC's USB ports (without USB HUB) and preferable to the USB ports mounted on the motherboard directly (mostly located on the rear side of the PC).*

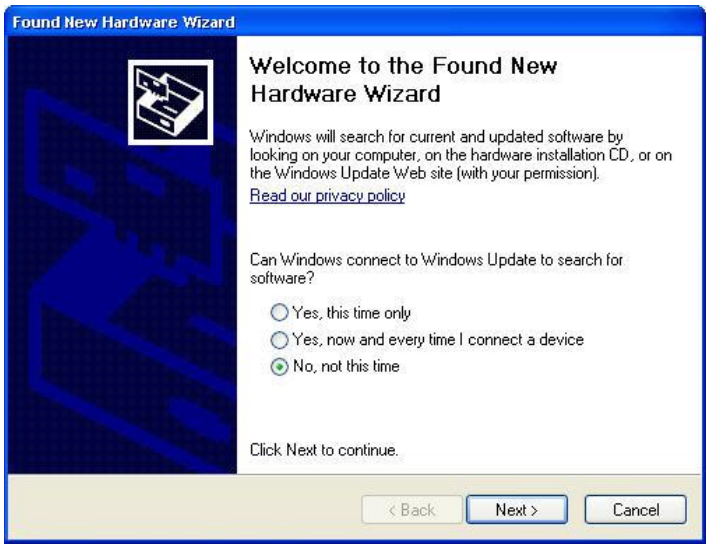
When the programmer is connected to USB port before control program was installed, Windows will detect new hardware and ask user to select driver installation method: automatically or manually. To detect programmer correctly, control program installation CD must be inserted to computer's CD-ROM drive and following steps have to be done:

Step 1.
Directly connect USB (LPT) cable to type B USB (LPT) port on programmer.
Step 2.
Directly connect USB (LPT) cable to type A USB2.0 (LPT) port on PC (high-speed recommended).
Step 3.
Connect connectors of power supply cable to appropriate connectors on programmer and wall plug.
Step 4.
Turn on programmer. At this time all 'work result' LEDs light up successive and then LEDs switch off.

For LPT connected programmer you may start work with your programmer now.
For USB connected programmer continue with next step.

Step 5.

Windows will start with “Found new hardware wizard”.
For Windows XP, Service Pack 2 users only:



Found New Hardware Wizard

Welcome to the Found New Hardware Wizard

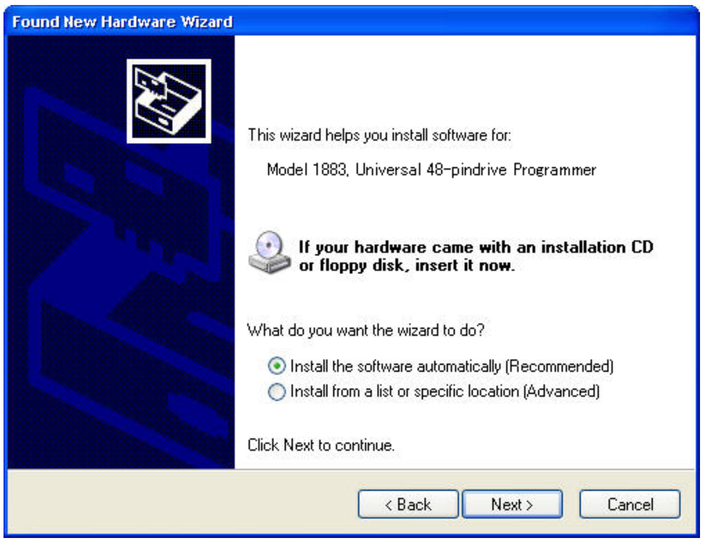
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy

Can Windows connect to Windows Update to search for software?

- ○ Yes, this time only
- ○ Yes, now and every time I connect a device
- [✓ No, not this time]

Click Next to continue.

Select “No, not this time” and then click on “Next” button.



Found New Hardware Wizard

This wizard helps you install software for:

Model 1883, Universal 48-pindrive Programmer

If your hardware came with an installation CD or floppy disk, insert it now.

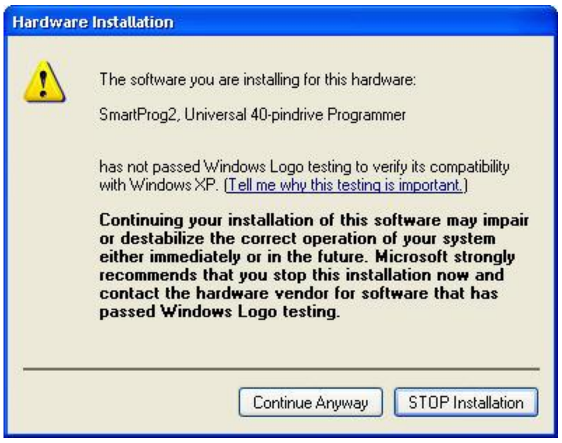
What do you want the wizard to do?

- [✓ Install the software automatically (Recommended)]
- ○ Install from a list or specific location (Advanced)

Click Next to continue.

Select “Install the software automatically” and then click on “Next” button.

Step 6.


Hardware Installation

The software you are installing for this hardware:

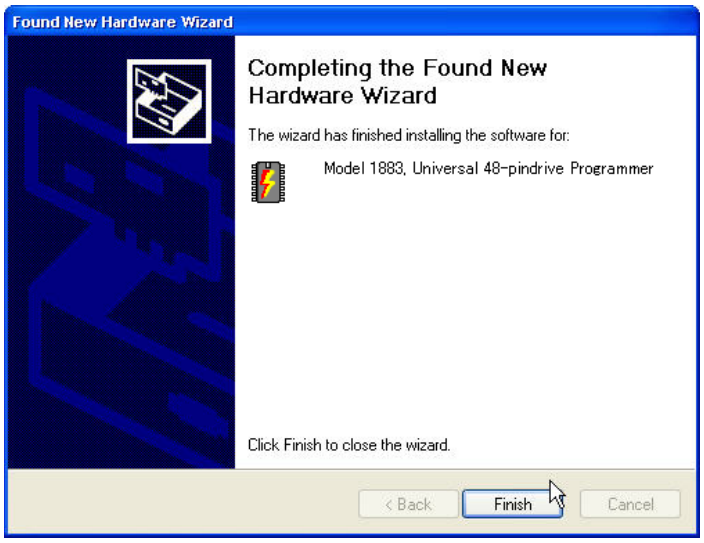
SmartProg2, Universal 40-pindrive Programmer

has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)

Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.

Click on “Continue Anyway” button.

Step 7.


Found New Hardware Wizard

Completing the Found New Hardware Wizard

The wizard has finished installing the software for:

Model 1883, Universal 48-pindrive Programmer

Click Finish to close the wizard.

Click “Finish” button to finish setup.

Step 8.

“Found new hardware wizard” will launch for each programmer one time. Hardware setup will be continued with Step 5.

Note: If a different USB port on the PC is used for the next connection of programmer, “Found new hardware wizard” will launch again and install new USB drivers.

Chapter 2

M1883 Cont Software (PG4UW)

Opetartion Manual

M1883 Control Software (PG4UW)

Using the programmer software

The control program delivered by MINATO Electronics, included on the CD in your package, is granted to be free from any viruses at the moment of delivery. To increase their safety our programs include a special algorithm for detecting possible virus infections.

Execute M1883 control program (PG4UW)

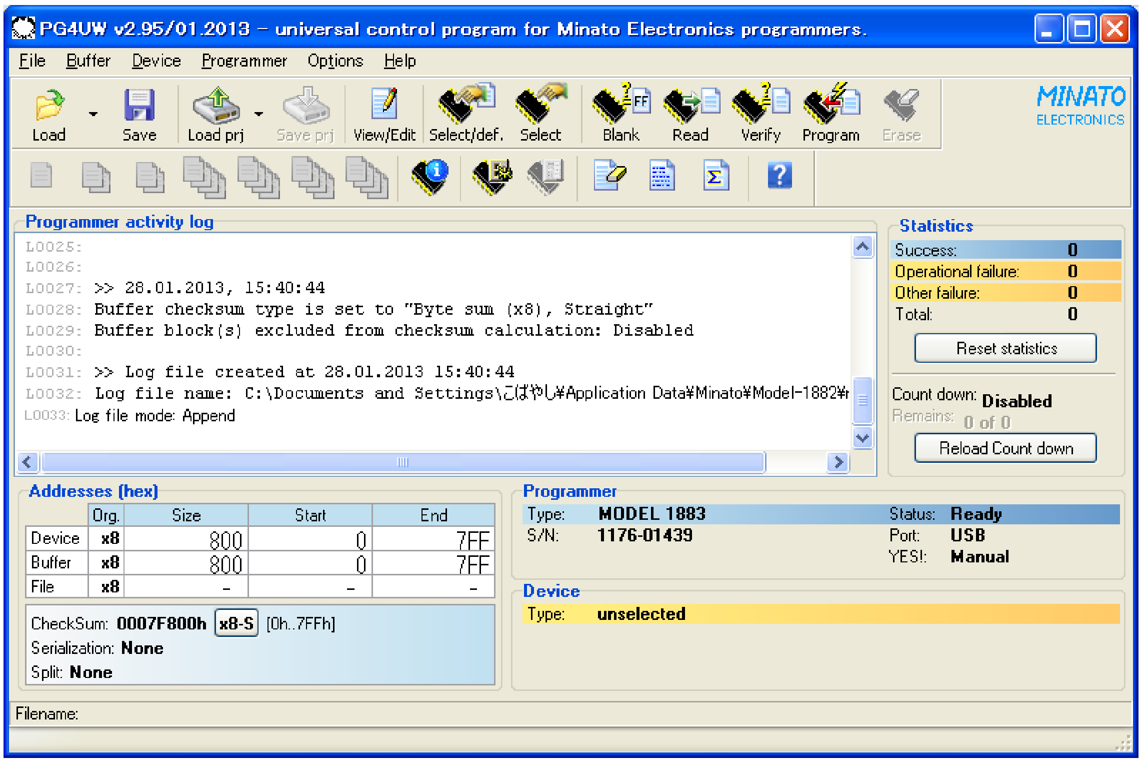
In Windows environment: double click to icon on display.

After start, control program automatically scan ports and search for the connected M1883 programmer.

Notes: When PG4UW is started, program is checked for its integrity.
Then the program display a standard user menu and waits for your instructions.

If the control program cannot communicate with the programmer, an error message appears on the screen, including error code and description of possible reasons (disconnected programmer, bad connection, power supply failure, incompatible printer port...). Eliminate the error source and press any key. If error condition still exists, the program resumes its operation in the demo mode and access to the programmer is not possible. If you cannot find the cause of the error, follow the instructions in **Troubleshooting** section. In addition, the control program checks communication with programmer prior to any operation with the programmed device.

Explanation of main display



Programmer activity log

```
L0025:
L0026:
L0027: >> 28.01.2013, 15:40:44
L0028: Buffer checksum type is set to "Byte sum (x8), Straight"
L0029: Buffer block(s) excluded from checksum calculation: Disabled
L0030:
L0031: >> Log file created at 28.01.2013 15:40:44
L0032: Log file name: C:\Documents and Settings\こばやし¥Application Data¥Minato¥Model-1882¥r
L0033: Log file mode: Append
```

Statistics

Success:	0
Operational failure:	0
Other failure:	0
Total:	0

Count down: **Disabled**
Remains: 0 of 0

Addresses (hex)

	Org.	Size	Start	End
Device	x8	800	0	7FF
Buffer	x8	800	0	7FF
File	x8	-	-	-

CheckSum: **0007F800h** x8-S [0h..7FFh]
Serialization: **None**
Split: **None**

Programmer

Type:	**MODEL 1883**	Status:	**Ready**
S/N:	**1176-01439**	Port:	**USB**
		YES!:	**Manual**

Device

Type: **unselected**

Filename:

Toolbars

Under main menu are placed toolbars with button shortcuts of frequently used menu commands. Toolbars are optional and can be turned off by menu command **Options / View**.

Log window

Log window contains the flow-control progress information about almost every operation made in PG4UW.
Operation can be:

- starting of PG4UW
- programmer search
- file/project load/save
- selection of device
- device operations (device read, blank check, programming, ...)
- remote control application connection and disconnection
- and other

Content of Log window can be saved to file concurrently while information is written to Log window. This option can be set by menu **Options / General options** (and tab *Log file* in dialog *General options*).

Panel Addresses

Panel Addresses contains information about actual address ranges of currently selected device, loaded file and buffer start-end address settings. Some devices allow modifying default device and buffer address ranges by menu command **Device / Device options / Operation options**.
Panel Addresses also contains some advanced information about current status of Split, Serialization and buffer checksum. For more information about each of the options, please look at:

- Split - menu Device / Device options / Operation options
- Serialization - menu Device / Device options / Serialization
- Checksum - menu Buffer / Checksum at section Checksum displayed in main window

Panel Programmer

Panel Programmer contains information about currently selected programmer.
The information includes

- programmer type
- port via programmer is connected to computer
- programmer status, can be one of following
  - Ready - programmer is connected, successfully found and ready to work
  - Not found - programmer is not found
  - Demo - when user selects option (button) Demo in dialog Find programmer
- YES! mode - some types of programmers allow to use special modes of starting next device operation in one of following ways -
  - manually by control program dialog Repeat
  - manually by button YES! placed directly on programmer
  - automatically - programmer automatically detects device removing and insertion of new device

  For more details please look at **Programmer / Automatic YES!**.

Panel Device

It contains information about currently selected device.
The information includes

- device name (type) and manufacturer
- device adapter needed to use with currently selected programmer
- reference to detailed *Device info* dialog, available also by menu **Device / Device info**
- reference to *Advanced device options* - this is available for some types of devices only

Panel Statistics

It contains statistics information about currently selected device.
The information includes

- number of successful, failure and total device operations
- count-down status indicating number of remaining devices

Statistics and count-down options are available by menu command **Device /**

Device options / Statistics or by mouse right click on panel *Statistics* and select item Statistics from popup menu

Panel File

The panel is placed on the bottom of PG4UW main window. Panel shows urrently loaded file or project name, size and date.

List of hot keys

<F1>	Help	Calls Help
<F2>	Save	Save file
<F3>	Load	Load a file into the buffer
<F4>	Edit	Viewing/editing of buffer
<F5>	Select/default	Target-device selection from 10 last selected devices list
<Alt+F5>	Select/manual	Target-device selection by typing device/vendor name
<F6>	Blank	Blank check
<F7>	Read	Reads device's content into the buffer
<F8>	Verify	Compares contents of the target device with the buffer
<F9>	Program	Programs target device
<Alt+Q>	Exit without save	Terminates the M1883
<Alt+X>	Exit and save	Terminates the M1883 and saving settings too
<Ctrl+F1>		Displays additional information about current device
<Ctrl+F2>	Erase	Fill's the buffer with a given value
<Ctrl+Shift+F2>		Fill's the buffer with random values.

File command

Menu **File** is used for source files manipulation, settings and viewing directory, changes drives, changes start and finish address of buffer for loading and saving files by **binary**, **MOTOROLA**, **MOS Technology**, **Intel (extended) HEX**, **Tektronix, ASCII space**, **JEDEC**, and **POF** format. The menu commands for loading and saving projects are located in this submenu too.

File / Load

Analyse file format and loads the data from specified file to the buffer. You can choose the format desired
(**binary**, **MOTOROLA**, **MOS Technology**, **Tektronix**, **Intel (extended) HEX**,
ASCII space, **JEDEC** and **POF**).
The control program stores a last valid mask for file listing. You can save the mask into the config. file by command **Options / Save options**.

Note for special x16 formats:
Intel HEXx16 is Intel Hex file format with 16 bits data word for TMS320F devices.
Motorola HEXx16 is Motorola file format with 16 bits data word for TMS320F devices.

File formats description:

ASCII HEX format

Each data byte is represented as 2 hexadecimal characters, and is separated by white space from all other data bytes. The address for data bytes is set by using a sequence of $Annnn, characters, where nnnn is the 4-hex characters of the address. The comma is required. Although each data byte has an address, most are implied. Data bytes are addressed sequentially unless an explicit address is included in the data stream. Implicitly, the file starts an address 0 if no address is set before the first data byte. The file begins with a STX (Control-B) character (0x02) and ends with a ETX (Control-C) character (0x03).

Note: The checksum field consists of 4 hex characters between the $S and comma characters. The checksum immediately follows an end code.

Here is an example of ASCII HEX file. It contains the data "Hello, World" to be loaded at address 0x1000:

```
^B $A1000,
48 65 6C 6C 6F 2C 20 57 6F 72 6C 64 0A ^C
$S0452,
```

ASCII SPACE format

Very simple hex file format similar as ASCII HEX without checksum field, without start (STX) and end (ETX) characters. Each data byte is represented as 2 hexadecimal characters, and is separated by white space from all other data bytes. The address field is separated by white space from data bytes. The address is set by using a sequence of 4-8 hex characters.

Here is an example of ASCII SPACE file. It contains the data "Hello, World" to be loaded at address 0x1000:

```
0001000 48 65 6C 6C 6F 2C 20 57 6F 72 6C 64 0A
```

Straight HEX format

Very simple hex file format similar as ASCII HEX without address and checksum fields, without start (STX) and end (ETX) characters. Each data byte is represented as 2 hexadecimal characters, and is separated by white space from all other data bytes.

Here is an example of Straight HEX file. It contains the data "Hello, World":

```
48 65 6C 6C 6F 2C 20 57 6F 72 6C 64 0A
```

Samsung HEX format

Samsung HEX file format is slight modification of Intel HEX format, therefore in the software is recognized and indicated as Intel HEX file format.

Checking the check box **Automatic file format recognition** tells program to detect file format automatically. When program can't detect file format from one of supported formats, the binary file format is assumed.

When the check box **Automatic file format recognition** is unchecked program allows user to manually select wished file format from list of available file formats on panel **Selected file format**. Default set is from **Options / General options** in panel **Load file format** at tab **File options**.

Attention: Program doesn't know recognize files in ASCII Hex format automatically, it recognizes them as binary. So download files in ASCII Hex format with disabled option for automatic file format recognition.

Additional operation

Panel **Additional operation** contains following settings:

Erase buffer before loading - checking the check box **Erase buffer before loading** tells the program to erase all buffer data using entered Erase value. Buffer erase is performed immediately before reading file content to buffer and it is functional for binary and all HEX file formats. Using this one-shot setting disables current setting of **Erase buffer before loading**

option in menu Options / General options at tab **Hex file options**

Swap bytes - if checked, it activates function of swapping bytes within 16bit words (or 2-byte words) during reading of file. This feature is useful especially when loading files with Motorola representation of byte order in file (big endian). Standard load file is using little endian byte order. For more information about big endian and little endian see Big endian and Little endian..

Add blank spare area - (for NAND Flash devices) if checked, adds blank spare area data during file load to relevant position in buffer (dependent on selected device).

Buffer offset for loading

Panel **Buffer offset for loading** contains one-shot offset setting for loading data from file to buffer. The setting is used to specify optional offset of loaded data to store to buffer. When Load file dialog window is opened, offset has always default setting None. It means, no offset is used to store read data in buffer.

Available offset options are:

None	this setting means, no offset is applied for loading data from file to buffer.
Positive offset	set of offset value, which is added to current address to store data to buffer. This offset is available for all formats and is used in x8 format, if current buffer organization is x8, or in x16 format, if current buffer organization is x16.
Negative offset	mode has two options:

Negative offset and **Automatic negative offset**
- set by two ways: manual or **automatic.**

For **manual** set use option **Negative offset** and put wished offset value to its edit box.
For **automatic** offset detection use option **Automatic negative offset**.
This value is subtracted from current address for save data to buffer.

Negative offset value (manually defined or automatically detected) is subtracted from current buffer address for store data to buffer.
Negative offset is applied only for all HEX file formats and is using always x8 format. Negative offset settings are ignored for binary files and other non-HEX files.

Notes for negative offset settings:

- Since the value of negative offset is subtracted from real address, the result fsubtraction can be negative number. Therefore take care of correct setting of this value!

- We recommend automatic set of negative offset in special cases only. This option contains a heuristic analyze, which can treat some data in file incorrectly. There are especially critical files, which contain a fragmented addresses range and which exceeds a size of selected device - some block can be ignored.
- Automatic negative offset option is not available for some kinds of special devices, that require HEX files with exactly specified blocks used for the devices - for example Microchip PICmicro devices. For these special devices, there are available only manual offset settings (None, Positive offset, Negative offset).

Example for negative offset using:
A file contains data by Motorola S - format.
A data block started at address FFFF0H.
It is a S2 format with length of address array of 3 bytes.
For all data reading you can set Negative offset option and value of negative offset to FFFF0H.

It means, that the offset will be subtracted from current real addresses and so data will be written from buffer address 0.

List of file format codes and error codes

There can occur some errors during file download in some of supported formats. The error is written to LOG window in face "Warning: error #xxy in line rrr", xx is file format code, y is error code and rrr is line number in decimal.

File format codes:
#00y - binary
#10y - ASCII Space
#20y - Tektronix
#30y - Extended tektronix
#40y - Motorola
#50y - MOS Technology
#60y - Intel HEX

Load file error codes:
#xx1 - bad first character - header
#xx2 - bad character in current line
#xx3 - bad CRC
#xx4 - bad read address
#xx5 - bad length of current line
#xx6 - too big negative offset
#xx7 - address is out of buffer range
#xx8 - bad type of selected file format
#xx9 - the file wasn't loaded all

File / Save

Saves data in the buffer, which has been created, modified, or read from a device onto a specified disk. The file format of saved file can be chosen from supported formats list box. There can be also entered the Buffer start and Buffer end addresses which exactly specify part of buffer to save to file. Supported file formats now are **binary**, **MOTOROLA**, **MOS Technology**, **Tektronix**, **Intel (extended) HEX**, **ASCII space**, **JEDEC** and **POF**.

If the checkbox **Swap bytes** is displayed, the user can activate function of swapping bytes within 16bit words (or 2-byte words) during writing to file. This feature is useful especially when saving files with Motorola representation of byte order in file (big endian). Standard save file operation is using little endian byte order.

For more information about big endian and little endian see Big endian and Little endian.

File / Load project

This option is used for loading project file, which contains device configuration buffer data saved and user interface configuration.

The standard dialog **Load project** contains additional window - **Project description** - placed at the bottom of dialog. This window is for displaying information about currently selected project file in dialog Load project.
Project information consists of:

- manufacturer and name of the first device selected in the project
- date and time of project creation
- user written description of project (it can be arbitrary text, usually author of project and some notes)

Note: for projects with serialization turned on

Serialization is read from project file by following procedure:

1. Serialization settings from project are accepted
2. Additional serialization file search is performed. If the file is found it will be read and serialization settings from the additional file will be accepted. Additional serialization file is always associated to the specific project file. When additional serialization file settings are accepted, project serialization settings are ignored.

Name of additional serialization file is derived from project file name by adding extension ".sn" to project file's name.
Additional serialization file is always placed to the directory "serialization¥" into the control program's directory.

Example:
Project file name: my_work.prj
Control program's directory: c:¥Program Files¥Programmer¥

The additional serialization file will be:
c:¥Program Files¥Programmer¥serialization¥my_work.prj.sn

Additional serialization file is created and refreshed after successful device program operation. The only requirement for creating additional serialization file is load project with serialization turned on.

Command **File / Save project** deletes additional serialization file, if the file exists, associated with currently saved project.

Enter job identification dialog

The dialog will be showed when loading protected project files.
It contains two editable fields:

Operator identification - this parameter will be used to identify rogrammer's operator. Operator ID must be at least 3 chars. User has to enter perator identification value, because it is mandatory parameter, when creating Job Report for protected project.

Enter Job ID - identification of current job.
Note: Dialog Enter job identification is not password dialog. Values of Operator identification and Job ID have informative purpose only, they will be included in Job Report. It does not relate to protected and/or encrypted project passwords.

File / Save project

This dialog is used for **project file** saving. **Project file** contains settings of device configuration and buffer data. Data saved to **project file** can be restored anytime by menu command File / Load project.

Description of actually selected project in file list box
Displays information about existing project file currently selected in dialog Save project. This box is only for information and is not writable.

Description of project being saved
Upper half displays information about actual program configuration including currently selected device, program mode, date and time, etc., and is not writable. These actual program settings are used for creation of project description header.

Bottom half is user editable and contains project description (arbitrary text) which usually consists of project author and some notes.

Prodduct protection setting

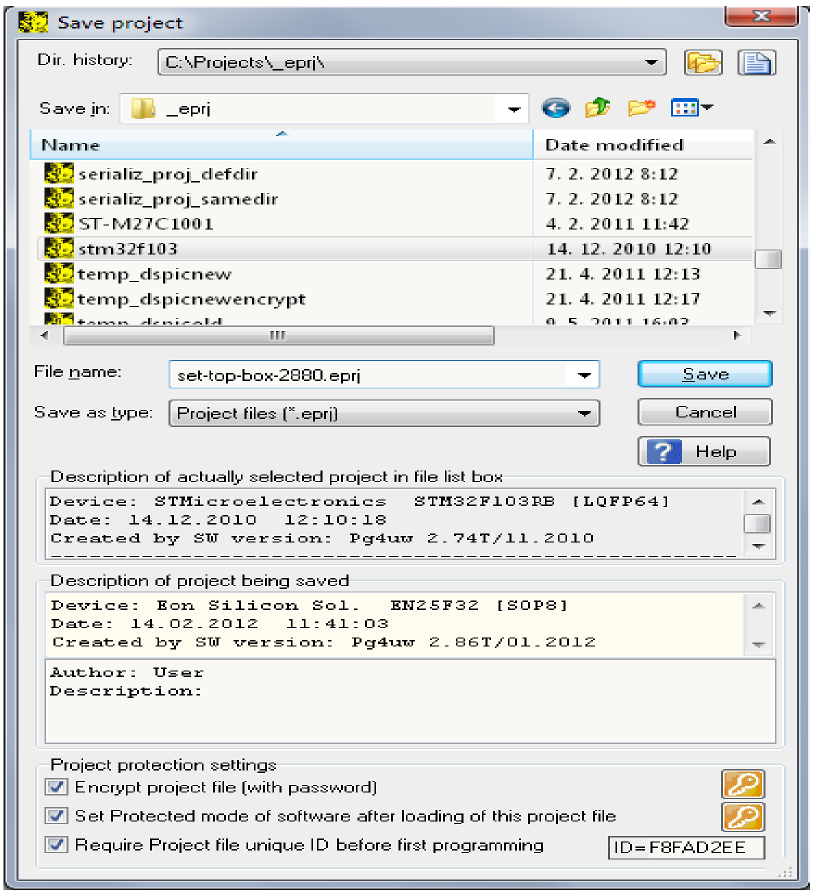
Encrypt project file (with password) is used to save project in special format using encryption algorithm. This prevents loading project file into software without knowledge of password. After clicking the button with key, password dialog appears, which is used to specify encryption password for project being saved.

Set Protected mode of software after loading of this project file is used to save project in special mode called Protected mode. After clicking the button with key, password dialog appears, which is used to specify Protected mode password for project being saved, and another security options (disable other project loading, device operations restriction) to prevent operator's mistakes. Projects saved with active **Protected mode** are special projects called **Protected mode projects**. For more detailed information about Protected mode projects see Options / Protected mode

Recommendation: passwords for Encrypt project file (with password) and Set Protected mode of software after loading of this project file should not be the same.

Require project file checksum before first programming
when active, software asks user for entering correct project file unique ID, before allowing to start the first device programming after load project. This feature is recommended for additional check, that correct project file is recently loaded. There is also recommended to use this checkbox along with active **Protected mode**. When the request of project file unique ID is active, the software indicates this by label **(ID)** next to project file name in bottom status line in control program main window.

Note: Option **Require project file unique ID before first programming** is replacement of former **Require project file checksum before first programming**. Unique ID advantage over generic checksum is, that unique ID is calculated not just from main device buffer data, but also from secondary buffers data used by device and available device settings. When the request of project file checksum is active, the software indicates this by label **(CSum)** next to project file name in bottom status line in control program main window. This option is no longer available in Save project dialog, but it can be activated after loading of older project file, that has the checksum request set on.



Dir. history: C:\Projects_eprj\

Save in: _eprj

Name	Date modified
serializ_proj_defdir	7. 2. 2012 8:12
serializ_proj_samedir	7. 2. 2012 8:12
ST-M27C1001	4. 2. 2011 11:42
stm32f103	14. 12. 2010 12:10
temp_dspicnew	21. 4. 2011 12:13
temp_dspicnewencrypt	21. 4. 2011 12:17

File name: set-top-box-2880.eprj

Save as type: Project files (*.eprj)

Description of actually selected project in file list box

```
Device:  STMicroelectronics   STM32F103RB  [LQFP64]
Date: 14.12.2010   12:10:18
Created by SW version: Pg4uw 2.74T/11.2010
```

Description of project being saved

```
Device: Eon Silicon Sol.   EN25F32 [SOP8]
Date: 14.02.2012   11:41:03
Created by SW version: Pg4uw 2.86T/01.2012
```

```
Author: User
Description:
```

Project protection settings
- [✓] Encrypt project file (with password)
- [✓] Set Protected mode of software after loading of this project file
- [✓] Require Project file unique ID before first programming ID=F8FAD2EE

Fig. Save project dialog

File / Reload file

Choose this option to reload a recently used file.

When you use a file, it is added to the **Reload file** list. Files are listed in order depending on time of use of them. Lastly used files are listed before files used far off.

To Reload a file:
1. From the File menu, choose Reload file.
2. List of lastly used files is displayed. Click the file you want to reload.

Note: When reloading a file the file format is used, by which the file was lastly loaded/saved.

File / Reload project

Choose this option to reload a recently used project.

When you use a project, it is added to the Reload project list. Projects are listed in order depending on time of use of them. Lastly used projects are listed before projects used far off.

To Reload a project:

1. From the File menu, choose Reload project.
2. List of lastly used projects is displayed. Click the project you want to reload.

File / Project options

This option is used for display/edit project options of actually loaded project. Project options means basic description of project including following project data:

- device name and manufacturer
- project creation date
- user defined project description (arbitrary text), e.g. project author and other text data for more detailed project description

User can directly edit user defined project description only. Device name, manufacturer, project date and program version are generated automatically by program.

File / Load encryption table

This command loads the data from binary file from disk and it saves them into the part of memory, reserved for an encryption (security) table.

File / Save encryption table

This command writes the content of the memory's part, reserved for an encryption table, into the file on the disk as a binary data.

File / Exit without save

The command deallocates heap, cancels buffer on disk (if exists) and returns back to the operation system.

File / Exit and save

The command deallocates heap, cancels buffer on the disk (if exists), saves current setting of recently selected devices to disk and returns back to the operation system.

Buffer command

Menu **Buffer** is used for buffer manipulation, block operation, filling a part of buffer with string, erasing, checksum and of course editing and viewing with other items (find and replace string, printing...).

Buffer / View/Edit

This dialog is used to **view** (view mode) or **edit** (edit mode) data in buffer. Use arrow keys for select data for edit. The data in buffer outside of area where are located data for the selected chip are shown using gray background.

View/Edit Buffer

F1	display help for actual window
F2	fill buffer block specified by start and end addresses by requested hex (or ASCII) string
Ctrl+F2	erase buffer with specified blank value
Ctrl+Shift+F2	fill buffer with random data
F3	copy specified block of buffer data at new address. Target address needn't be out from source block addresses.
Shift+F2	save buffer data to binary file. This command is available for secondary buffers only. Secondary buffers are special areas used for some devices, for example **Data EEPROM** for Microchip PICmicro devices. Commands for Load/Save data to/from Main buffer are available in main menu "File" and also by buttons Load, Save in main application window.
Shift+F3	load data from binary file to buffer. This command is available for secondary buffers only. For more information see notes for save buffer data command (Shift+F2) above
F4	move block is used to move specified block of data in current buffer on new address. Target address needn't be out from source block addresses. Source address block (or part) will be filled by topical blank character.
F5	swap bytes command swaps a high- and low- order of byte pairs in current buffer block. This block must started on even address and must have an even number of bytes. If this conditions do not fulfil, the program modifies addresses itself (start address is moved on lower even address and/or end address is moved on higher odd address).

F6	print buffer
F7	find string (max. length 16 ASCII characters)
F8	find and replace string (max. 16 ASCII chars.)
F9	change current address
F10	change mode view / edit
F11	switch the mode of buffer data view between 8 bit and 16 bit view. It can be also do by mouse clicking on the button to the right of View/Edit mode buffer indicator. This button indicates actual data view mode (8 bit or 16 bit), too.
F12	checksum dialog allows to count checksum of selected block of buffer change mode view / edit

Arrow keys	move cursor up, down, right and left
Home/End	jump on start / end current line
PgUp/PgDn	jump on previous / next page
Ctrl+PgUp/PgDn	jump on start / end current page
Ctrl+Home/End	jump on start / end current device
Shift+Home/End	jump on start / end current buffer
Backspace	move cursor one position left (back)

Note: characters 20H - FFH (mode ASCII) and numbers 0..9, A..F (mode HEX) immediately changes content of edit area.

Warning: Editing of ASCII characters for word devices is disabled.

View/Edit buffer for PLD

Ctrl+F2	erase buffer with specified blank value
Ctrl+Shift+F2	fill buffer with random data
F9	go to address...
F10	change mode view / edit
F11	switch the mode of buffer data view between 1 bit and 8 bit view. It can be also do by mouse clicking on the button to the right of View/Edit mode buffer indicator. This button indicates actual data view mode (1 bit or 8 bit), too.

Arrow keys	move cursor up, down, right and left
Home/End	jump on start / end current line
PgUp/PgDn	jump on previous / next page
Ctrl+PgUp/PgDn	jump on start / end current page
Ctrl+Home/End	jump on start / end edit area
Backspace	move cursor one position left (back)

Note: Characters 0 and 1 immediately changes content of edit area.

Buffer / Fill block

Selecting this command causes filling selected block of buffer by requested hex (or ASCII) string.

Selecting option "Allow address history logging" activates saving of recently confirmed values. These are saved for each device separately, count is limited to last 15 items.
Note: Address history values are common for all buffer data manipulation dialogs.

Default address range is set according to buffer range of selected device. Selecting option "Maintain last inserted values" causes that for the next time you open this dialog, previously confirmed values will be reloaded as default.

Buffer / Copy block

This command is used to copy specified block of data in current buffer on new address. Target address needn't be out from source block addresses.

Buffer / Move block

This command is used to move specified block of data in current buffer on new address. Target address needn't be out from source block addresses. Source address block (or part) will be filled by topical blank character.

Selecting option "Allow address history logging" activates saving of recently confirmed values. These are saved for each device separately, count is limited to last 15 items.
Note: *Address history values are common for all buffer data manipulation dialogs.*

Default address range is set according to buffer range of selected device. Selecting option "Maintain last inserted values" causes that for the next time you open this dialog, previously confirmed values will be reloaded as default.

Buffer / Swap block

This command swaps a **high- and low- order of byte pairs, foursomes, nibbles** inside bytes or **bits** inside bytes depending on swap mode selected by user. Swap operation is performed on buffer block specified by Start and End addresses. This block must start on even address and must have an even number of bytes. If the conditions do not fulfill, the program modifies addresses itself (start address is moved on lower even address and/or end address is moved on higher odd address).

Following swap modes are available, user can select from:

1. Swap 2-bytes inside 16-bit words
   This option makes swap of byte pairs inside 16-bit words.

2. Swap 4-bytes inside 32-bit words
   This option makes swap of byte pairs inside 32-bit words.

3. Swap nibbles inside bytes
   This option makes swap of high- and low- nibbles inside each byte.

4. Mirror bits inside bytes
   This option makes mirroring of bits inside each byte.

Examples of swap operation in buffer:

Swap bytes operation from Start address 0 to End address N modifies data in buffer by following tables:

Address	Original Buffer Data	Swap 2-bytes inside 16-bit words	Swap 4-bytes inside 32-bit words	Swap nibbles inside bytes	Mirror bits inside bytes
0000h	b0	b1	b3	b0n	b0m
0001h	b1	b0	b2	b1n	b1m
0002h	b2	b3	b1	b2n	b2m
0003h	b3	b2	b0	b3n	b3m
0004h	b4	b5	b7	b4n	b4m
0005h	b5	b4	b6	b5n	b5m
0006h	b6	b7	b5	b6n	b6m
0007h	b7	b6	b4	b7n	b7m

b0, b1, b2, ... means original buffer byte values from addresses 0, 1, 2, ...
b0n, b1n, b2n, ... means nibble-swapped original bytes b0, b1, b2, ... by following rules:

Original Byte bits	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Nibble-swapped Byte Bits	bit 3	bit 2	bit 1	bit 0	bit 7	bit 6	bit 5	bit 4

Original Byte bits	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
Mirrored Byte Bits	bit 0	bit 1	bit 2	bit 3	bit 4	bit 5	bit 6	bit 7

Selecting option "Allow address history logging" activates saving of recently confirmed values. These are saved for each device separately, count is limited to last 15 items.
Note: Address history values are common for all buffer data manipulation dialogs.

Default address range is set according to buffer range of selected device. Selecting option "Maintain last inserted values" causes that for the next time you open this dialog, previously confirmed values will be reloaded as default.

Buffer / Erase block

If this command is selected, the content of the buffer will be filled with topical blank character.

Selecting option "Allow address history logging" activates saving of recently confirmed values. These are saved for each device separately, count is limited to last 15 items.
Note: Address history values are common for all buffer data manipulation dialogs.

Default address range is set according to buffer range of selected device. Selecting option "Maintain last inserted values" causes that for the next time you open this dialog, previously confirmed values will be reloaded as default.

The reserved key **<Ctrl+F2>** will bring out this menu from any menu and any time.

Buffer / Fill block with random data

If this command is selected, the content of the buffer will be filled with random data.

Selecting option "Allow address history logging" activates saving of recently confirmed values. These are saved for each device separately, count is limited to last 15 items.
Note: Address history values are common for all buffer data manipulation dialogs.

Default address range is set according to buffer range of selected device. Selecting option "Maintain last inserted values" causes that for the next time you open this dialog, previously confirmed values will be reloaded as default.

The reserved key **<Shift+Ctrl+F2>** will bring out this menu from any menu and any time.

Buffer / Duplicate buffer

This command performs duplicate buffer content in range of source EPROM to range of destination EPROM. This procedure is suitable if there is used for example 27C512 EPROM to 27C256 EPROM position.
Note: The procedure always uses buffer start address 00000h.

Buffer / View/Edit / Print buffer

This command allows write selected part of buffer to printer or to file. Program uses at it an external text editor in which selected block of buffer is displayed and can be printed or saved to file, too. By default is set simple text editor **notepad.exe**, which is standard part of all versions of Windows.

In Print buffer dialog are following options:

Block start

Defines start address of selected block in buffer.

Block end

Defines end address of selected block in buffer.

External editor

This item defines path and name of external program, which has to be used as text viewer for selected block of buffer. By default is set simple text editor notepad.exe, which is standard part of all versions of Windows. User can define any text editor for example wordpad.exe, which is able to work with large text files. In user defined text editor user can print or save to file selected block of buffer.
The external editor path and name is saved automatically to disk.

Buffer / View/Edit / Find text

Find to text

Enter the search string to **Find** to text input box and choose **<Find>** to begin the search or choose **<Cancel>** to forget it.

Direction

Direction box specifies which way you want to search, starting from the current cursor position (In edit mode). **Forward** (from the current position or start of buffer to the end of the buffer) is the default. **Backward** searches toward the beginning. In view mode searches all buffer.

Origin

Origin specifies where the search should start.

Buffer / View/Edit / Replace text

Text to find

Enter the search string in the Text to find string input box.

Replace with

Enter the replacement string in the Replace with input box.

Options

In Options box you can select prompt on replace: if program finds instance you will be asked before program change it.

Direction

Direction box specifies which way you want to search, starting from the current cursor position (In edit mode). **Forward** (from the current position or start of buffer to the end of the buffer) is the default. **Backward** searches toward the beginning. In view mode searches all buffer.

Press **<Esc>** or click **Cancel** button to close dialog window.

Origin

Origin specifies where the search should start.

By pressing **Replace** button the dialog box is closed and a Question window is displayed.

This window contains following choices:

Yes	replaces found item and finds next
No	finds next item without replacing current one
Replace All	replaces all found items
Abort search	aborts this command

Buffer / Checksum

Checksum of data stored in buffer of PG4UW is useful to check the data are correct.

PG4UW contains following functions related to checksum:

Tab Checksum calculator

This tab is on-demand **checksum calculator** that can calculate and display various types of checksums of various data blocks in buffer. **(*1)**

Tab Main checksum options

This tab contains options for **Automatic checksum calculator** with **Main checksum** value displayed in main window of PG4UW in table **Addresses** and in **Log window** of PG4UW **(*2)**

Checksum calculator

contains on-demand checksum calculator. **(*1)**

Custom address range for chksum calculation

Fields **From address** and **To address** are used to enter address range for main checksum calculation. Addresses are used only when checkbox **Enabled** is checked. Address is always defined as Byte address.

Buffer block(s) exclude from checksum calculation

Useful for example for **serialization**. Serialization usually modifies data at specified addresses in buffer. So there is problem to check the checksum of buffer, when data on some addresses were changed by serialization engine before each device programming. If part of buffer (data block) used for serialization is excluded from checksum calculation, the checksum of buffer data will not be changed by serialization data changes. One or more excluded blocks can be specified.

Results

Fields displaying values of calculated **checksum types**: see description of types at the bottom.

- Column marked as **STRAIGHT** is result of checksum calculation without additional adjustments.
- Column marked as **NEGATED** is a negation of checksum so, that SUM + NEG. = FFFFH.
- Column marked as **SUPPLEMENT** is complement of checksum so, that SUM + SUPPL. = 0 (+ carry).

Insert checksum options

This box contains following options for **Calculate & insert** operation:

- **Insert checksum**
  Kind of checksum that is written into the buffer when, the **Calculate & insert** operation was executed.

- **Insert at address**
  Address in buffer where a result of chosen checksum is written, when the **Calculate & insert** was executed. Address can not be specified inside the range <**From address**> to <**To address**>. Address is always defined as Byte address.

- **Size**
  Size of chosen checksum result, which will be written into the buffer. A size of inserted checksum may be **Byte** (8-bit), **Word** (16-bit) or **DWORD** (32-bit). If size is smaller then selected checksum size, only lower byte(s) of checksum value will be written into the buffer.
  Note: If **Word** size was selected, a low byte of checksum value will be written on address specified in box **Insert address** and a high byte will be written on address incremented by one. Similarly it is for **DWORD**.

- **Calculate** button - click on the button Calculate starts calculating checksums for selected block in buffer. No writes into the buffer are executed**.**

- **Calculate & insert** button - click on the button **Calculate & insert** starts calculating checksums for selected block in the buffer and writes the chosen checksum into the buffer on address specified by **Insert address**. This function is available for Byte, Word, CRC-CCITT and CRC-XMODEM checksums.

- **Close** button - closes dialog Checksum.

(*1) These values aren't saved into project, they are initialized to defaults with each new device selection.

Main checksum options

allows you to set mode of **Automatic checksum calculator**. **(*2)**

Custom address range for main checksum

Enabled - user defined addresses are used to calculate checksum of buffer data, otherwise,
if **Disabled**, global Buffer start and Buffer end address is used for calculation of checksum of buffer data

Fields **From address** and **To address** are used to enter address range for main checksum calculation. Addresses are used only when checkbox **Enabled** is checked.

Checksum type

Selection group Checksum type allows to select wished kind of checksum to be used for main checksum. More information about **Checksum types** can be found at the bottom of this page.

Buffer block(s) exclude from checksum calculation

Exclude buffer block(s) from checksum calculation - same as for Tab **Checksum calculator**

Result contains actual value of recently calculated checksum.

- **Apply** button is used to confirm checksum settings from **Main checksum options**. Please note, that once the button is pressed, previous checksum settings are lost.

- **Close** button is used to close the Checksum dialog. If you made some changes in settings, they won't take effect until you press **Apply.**

(*2) These values are stored into configuration file and project file. Setting from project file has higher precedence.

Checksum types

Byte sum (x8)

Buffer data are summed byte-by-byte irrespective of current buffer view mode (x8/x16/x1) organization. Any carry bits exceeding 32-bits are neglected. This checksum mode is indicated by string (x8) displayed after checksum value in main program window.

Word sum Little Endian (x16)

Buffer data are summed word-by-word irrespective of current buffer view mode organization. Any carry bits exceeding 32-bits are neglected. This checksum mode is indicated by string (x16 LE) displayed after checksum value in main program window. Term Little Endian means, the buffer checksum is calculated from words read from buffer in Little Endian mode.

Word sum Big Endian (x16)

Buffer data are summed word-by-word irrespective of current buffer view mode organization. Any carry bits exceeding 32-bits are neglected. This checksum mode is indicated by string (x16 BE) displayed after checksum value in main program window. Term Big Endian means, the buffer checksum is calculated from words read from buffer in Big Endian mode.

CRC-CCITT

Buffer data are summed by bytes to Word using polynomial x^16+x^12+x^5+1 (0x1021), init value 0, and XOR out 0, reflexions in/out are off

CRC-XMODEM

Buffer data are summed by bytes to Word using polynomial x^16 + x^15 + x^2 +1 (0x8005), init value 0

CRC-16

Buffer data are summed by bytes to sum by bytes to WORD using standard CRC-16 algorithm with polynome x^16+x^15+x^2+1 (0x8005), init value 0, and XOR out 0

CRC-32

Buffer data are summed by bytes to DWORD using standard CRC-32 algorithm with polynome 0x04C11DB7, init value 0xFFFFFFFF, and XOR out 0xFFFFFFFF

MD5

an MD5 hash expressed as a sequence of 32 hexadecimal digits (128 bits)

SHA-1

"Secure Hash Standard" expressed as a sequence of 40 hexadecimal digits (160 bits)

Checksum forms

Straight

checksum without additional adjustments.

Negated

negation of checksum so, that SUM + NEG. = FFFFH.

Supplement

is complement of checksum so, that SUM + SUPPL. = 0 (+ carry).

Device dependent checksum

applies for some devices, e.g. STMicroelectronics's STM8 family The checksum modes for **main checksum** can be set in pop-up menu by clicking on label checksum in main program window or by menu shortcuts **Shift+Ctrl+1** for Byte sum (x8), **Shift+Ctrl+2** for Word sum Little Endian (x16) or **Shift+Ctrl+3** for Word sum Big Endian (x16) etc..

Word is 16-bit word. **DWORD** is 32-bit word.

Tip: More information about Little and Big Endian can be found at http://en.wikipedia.org/wiki/Endianness.

Device command

Menu **Device** includes functions for a work with selected programmable devices - device select, read data from device, device blank check, device program, device verify and device erase.

Device / Select from default devices

This window allows selecting the desired type of the device from list of default devices. This one is a cyclic buffer in which are stored recently selected devices including their device options. This list is saved to disk by command **File / Exit and save**.

If you wish display additional information about the current device, use an **<Ctrl+F1>** key. This command provides a size of device, organization, programming algorithm and a list of programmers (including auxiliary modules) that supported this device. You can find here package information and other general information about current device too.

Use a **<Del>** key for delete of current device from list of default devices. There isn’t possible to empty this list, if you repeat this access. The last device stays in buffer and the **<Del>** key isn't accepted.

Device / Select device ...

This window allows selecting the desired type of the device from all devices supported by current programmer. It is possible to choose device by **name**, by **type** or by **manufacturer**.

Note 1: The names of the programmable devices in software don't contain all characters, shown at the top of the chip or mentioned in the datasheet section part numbering. The names contain all characters necessary to identification of the device, but don't contain such codes, that have none influence to the programming, for example temperature code, speed code, packing type code, etc.. If such code letter is at the end of the name, is omitted, if such code letter is in the middle of name, then is replaced by character 'x'.

Examples:

- Devices Am27C512-150, Am27C512-200 and Am27C512-250 are shown in the software only once, as Am27C512
- S29GL064N11TF1010 device is shown in the software as S29GL064NxxTxx01

Note 2: If some device is listed twice and the second time with suffix x16, it means, that programming algorithm provides faster word mode.

Selected device is automatically saved to buffer of default devices. This buffer is accessible with **Device / Select from default devices** command.

In the **Search mask** field you can enter mask for filtering of whole device list by device name, manufacturer and/or programming adapter names. The space as delimiter of filter items (fragments) has "OR" function. If you want to enter exact filter string including spaces, use quotation mark character ".

Example:
We need to see the devices that need no adapter, and we know that such devices have following note string in **Adapter** column of device list: Note: in ZIF socket of programmer. The suitable filter to show only wished devices is "in ZIF" (including quotation marks). The filter strings are not case sensitive, i.e. for example "ZIF" is the same as "zif".

If you wish display additional information about the current device, use button **Device info** or an **<Ctrl+F1>** key. This command provides a size of device, organization, programming algorithm and a list of programmers (including auxiliary modules) that supported this device. You can find here package information and other general information about current device too.

The currently displayed device list can be saved to text file by pressing button **Save currently displayed list to file**.

Select device ... / All

This window allows selecting the desired type of the device from all devices supported by current programmer. Supported devices are displayed in a list box.

Device can be select by double click on a line from list with desired manufacturer name and device number or by entering manufacturer name and/or device number in a search box (use a key **<Space>** as a separation character) and press **<Enter>** or click **OK** button.

Press a key **<Esc>** or click **Cancel** button at any time to cancel device selection without affecting the currently selected device.

Selected device is automatically saved to buffer of default devices. This buffer is accessible with **Device / Select from default devices** command.

If you wish display additional information about the current device, use button **Device info** or an **<Ctrl+F1>** key. This command provides a size of device, organization, programming algorithm and a list of programmers (including auxiliary modules), which supported this device. You can find here package information and other general information about current device too.

Select device ... / Only selected type

This window allows selecting the desired type of the device. At the first - you must select a device type (e.g. EPROM) and device subtype (e.g. 64Kx8 (27512)), using mouse or cursor keys. It will cause a list of manufacturers and devices will be displayed.

Device can be select by double click on a line from list with desired manufacturer name and device number or by entering manufacturer name and/or device number in a search box (use a key **<Space>** as a separation character) and press **<Enter>** or click **OK** button.

Press a key **<Esc>** or click **Cancel** button at any time to cancel device selection without affecting the currently selected device.

Selected device is automatically saved to buffer of default devices. This buffer is accessible with **Device / Select from default devices** command.

If you wish display additional information about the current device, use button **Device info** or an **<Ctrl+F1>** key. This command provides a size of device, organization, programming algorithm and a list of programmers (including auxiliary modules) that supported this device. You can find here package information and other general information about current device too.

Select device ... / Only selected manufacturer

This window allows selecting the desired device type by manufacturer. First select a required manufacturer in Manufacturer box using mouse or cursor keys. It will cause a list of selected manufacturer devices will be displayed.

Device can be select by double click on a line from list with desired manufacturer name and device number or by entering device number in a search box (use a key **<Space>** as a separation character) and press **<Enter>** or click **OK** button.

Press a key **<Esc>** or click **Cancel** button at any time to cancel device selection without affecting the currently selected device.

Selected device is automatically saved to buffer of default devices. This buffer is accessible with **Device / Select from default devices** command.
If you wish display additional information about the current device, use button **Device info** or an **<Ctrl+F1>** key. This command provides a size of device, organization, programming algorithm and a list of programmers (including auxiliary modules) that supported this device. You can find here package information and other general information about current device too.

Device / Select EPROM /Flash by ID

Use this command for autoselect an EPROM or Flash as active device by reading the device ID. The programmer can automatically identify certain devices by the reading the manufacturer and the device-ID that are burnt into the chip. This only applies to EPROM or Flash that supports this feature. If the device does not support a chip ID and manufacturer's ID, a message will be displayed indicating this as an unknown or not supported device.

If more devices with identical chip ID and manufacturer's ID were detected, the list of these devices will be displayed. A corresponding device can be chosen from this list by selecting its number (or manufacturer name) from list and press **<Enter>** (or click **OK** button). Press a key **<Esc>** or click **Cancel** button at any time to cancel device selection without affecting the currently selected device.

Warning: The control program only support this time EPROM’s and Flash with 28 and 32 pins. Any of programmers determines pins number automatically. For other programmers you must enter this number manually.

The programmer applies a high voltage to the appropriate pins on the socket. This is necessary to enable the system to read the device ID. Do not insert into the socket a device that is not an EPROM or Flash. It may be damaged when the programmer applies the high voltage.

We don't recommend apply this command to:
1) 2764 and 27128 EPROM types, because most of them ID not supports
2) Flash memories with non-standard pinout (e.g. Firmware Hub Flash)
3) Flash memories, which don't accept Vid voltage at A9 pin
4) low voltage EPROM and Flash memories

Device / Device options

All settings of this menu are used for programming process, serialization and associated file control.

Device / Device options / Operation options

All settings of this command are used for programming process control. This is a flexible environment, which content items associated with current device and programmer type. Items, which are valid for the current device but aren't supported by current programmer, are disabled. These settings are saving to disk along with associated device by **File / Exit and save** command.

The commonly used term are also explained in the user manual to programmer. The special terms used here are exactly the terms used by manufacturer of respective chip. Please read the documentation to the chip you want to program for explanation of all used terms.

List of commonly used items:

- **Address**

Device start address	(default 0)
Device end address	(default device size-1)
Buffer start address	(default 0)
Split	(default none)

This option allows to set special mode of buffer when programming or reading device.
Using split options is particularly useful when using 8-bit data memory devices in 16-bit or 32-bit applications.

Following table describes buffer to device and device to buffer data transfer

Split type	Device	Buffer Address assignment
None	Device[ADDR] <==>	Buffer[ADDR]
Even	Device[ADDR] <==>	Buffer[0+(2*ADDR)]
Odd	Device[ADDR] <==>	Buffer[1+(2*ADDR)]
1./4	Device[ADDR] <==>	Buffer[0+(4*ADDR)]
2./4	Device[ADDR] <==>	Buffer[1+(4*ADDR)]
3./4	Device[ADDR] <==>	Buffer[2+(4*ADDR)]
4./4	Device[ADDR] <==>	Buffer[3+(4*ADDR)]

Real addressing will be following: (all addresses are hexadecimal)

Split type	Device addresses <==>Buffer addresses
None	00 01 02 03 04 05<==>00 01 02 03 04 05
Even	00 01 02 03 04 05<==>00 02 04 06 08 0A
Odd	00 01 02 03 04 05 <==>01 03 05 07 09 0B
1./4	00 01 02 03 04 05 <==>00 04 08 0C 10 14
2./4	00 01 02 03 04 05 <==>01 05 09 0D 11 15
3./4	00 01 02 03 04 05 <==>02 06 0A 0E 12 16
4./4	00 01 02 03 04 05 <==>03 07 0B 0F 13 17

Terms explanation:

Access to device address ADDR is written as Device[ADDR].
Access to buffer address ADDR is written as Buffer[ADDR].
ADDR value can be from zero to device size (in bytes).
All addresses are byte oriented addresses.

- **Insertion test:**

  insertion test (default ENABLE)

  If enabled, the programmer checks all pins of the programmed chip, if have proper connection to the ZIF socket (continuity test). The programmer is able to identify the wrong contact, misinserted chip and also (partially) backinserted chip.

- **Device ID check error terminates the operation** (default ENABLE)

  Programmer provides ID check before each selected action. It compares read ID codes from device with ID codes defined by device manufacturer. In case of ID error, control program behaves as follows:
  - if item is set to ENABLE, selected action is finished
  - if item is set to DISABLE, selected action continues. Control program just writes warning message about ID error to LOG window.

  If enabled, the programmer checks the electronic ID of the programmed chip.

  Note 1: Some old chips don't carry electronic ID.
  Note 2: In some special cases, several microcontrollers don't provide ID, if copy protection feature in the chip is set, even if device ID check setting in control program is set to "Enable".

- **Command execution:**

  blank check before programming (default DISABLE)

  erase before programming (default DISABLE)

  verify after reading (default ENABLE)

  verify (ONCE, TWICE)

  verify options (nominal VCC +/-5%
  nominal VCC +/-10%
  VCCmin - VCCmax)

- **Target system power supply parameters**

This group is available in ISP mode for some types of devices. It contains following settings:

Enable target system power supply - enables supplying of target system from programmer. Supply voltage for target system is switched on before action with programmed device and is switched off after action finished. If Keep ISP signals at defined level after operation is enabled, then programmer will switch off supply voltage after pull-up/pull-down resistors are deactivated.

Voltage - supply voltage for target system. Supply voltage range is from 2V to 6V.
Note: *The voltage value given to target system depends also on current flowing to target system. To reach exact voltage supply for target system, the proper Voltage and Max. current values has to be defined. The Max. current value specified has to be as exact as possible equal to real current consumption of target system.*

Max. current - maximum current consumption of powered target system. Current consumption range is from 0 to 300mA

Voltage rise time - determines skew rate of rising edge of target system power supply voltage (switch on supply voltage).

Target supply settle time - determines time, after which must be supply voltage in target system stabilized at set value and target system is ready to any action with programmed device.

Voltage fall time - determines skew rate of falling edge of target system power supply voltage (switch off supply voltage).

Power down time - determines time after switch off target system power supply within target system keeps residual supply voltage (e.g. from charged capacitor). After this time elapsed target system has to be without supply voltage and can be safely disconnected from programmer.

- **Target system parameters**

This group is available in ISP mode for some types of devices. It contains following settings:
Oscillator frequency (in Hz) - oscillator's frequency of device (in target system). Control program sets programming speed by its, therefore is necessary set correct value.

Supply voltage (in mV) - supply voltage in target system. Control program checks or sets (it depends on programmer type) entered supply voltage in target system before every action on device.

Disable test supply voltage - disables measure and checking supply voltage of programmed device, set in Supply voltage edit box, before action with device.

Delay after reset active - this parameter determine delay after Reset signal active to start action with device. This delay depends on values of used devices in reset circuit of device and can be chosen from these values: 10ms, 50ms, 100ms, 500ms or 1s.

I**nactive level of ISP signals -** this parameter determine level of ISP signals after finishing access to target device. Signals of ISP connector can be set to Pull-up (signals are tied through 22k resistors to supply voltage) or Pull-down (signals are tied through 22k resistors to ground).

Keep ISP signals at defined level after operation - enables keeping set level of ISP signals after access to target device finished. Control program indicates activated pull-up/pull-down resistors by displaying window with warning. After user close this window control program will deactivate resistors.

- **Programming parameters**
  This group is available for some types of devices. It contains settings of which device parts or areas has to be programmed.

- **Erase parameters**
  This group is available for some types of devices. It contains special settings of erase modes of selected device.

Device / Device options / Serialization

Serialization is special mode of program. When a serialization mode is activated, a specified value is automatically inserted on predefined address into buffer before programming each device. When more devices are programmed one by one, the serial number value is changed for each device automatically and inserted into buffer before programming device, so each device has unique serial number.

There are three types of serialization:

- Incremental mode
- From file mode
- Custom generator mode

Dialog **Serialization** contains also settings for associated serialization position files that are used with project files with serialization turned on. For more detailed information about using serialization in project files, look at Serialization and projects.

Basic rules of serialization:

If a new device is selected, the serialization function is set to a default state i.e. disabled.

Actual serialization settings for actually selected device are saving to disk along with associated device by **File / Exit and save** command.
When incremental mode is active following actual settings are saved to configuration file: address, size, serial value, incremental step and settings of modes ASCII / BIN, DEC / HEX, LS byte / MS Byte first.

When from-file mode is active following actual settings are saved to configuration file: name of input serialization file and actual label, which indicates the line with actual serial number in input file.

When program is in multiprogramming mode (multiple socket programmer is actually selected) the special section **- Action on not programmed serial values due to error** - is displayed in dialog **Serialization**. In this section two choices are available:

- Ignore not programmed serial values
- Add not programmed serial values to file

Ignore not programmed serial values means the not programmed serial values are ignored and no action is done with them.

Add not programmed serial values to file means the not programmed serial values are added to file. The file of not programmed serial values has the same text format as serialization file for ”From-file” serialization mode. So there is possible to program the serial values later on by ”From-file” serialization mode.

Notes: If device programming is stopped by user, program will not change the serial values ready for next batch of devices. The same situation is if device program is incomplete, e.g. for device insertion test error.
Ignoring or writing not programmed serial values is only used when at least one device from current batch of devices in multiple socket module programmer is completely programmed and verified without errors.

Serialization can work with control program's main buffer or extended buffers available for some types of devices, for example Microchip PIC16Fxxx devices with Data EEPROM Memory. The selection which buffer has to be used by serialization routine is available in dialog Serialization. The extended buffer selection is ignored for From-file serialization in playlist file mode. For more details about this limitation, see the **From file mode** serialization mode description please.

Device / Device options / Serialization / Incremental mode & SQTP

The **Incremental mode & SQTP** enables to assign individual serial numbers to each programmed device.A starting number entered by user will be incremented by specified step for each device program operation and loaded in selected format to specified buffer address prior to programming of each device. Options available in Incremental mode serialization allow also set equivalent serialization to Microchip SQTP used for Microchip PICmicro® devices.

There are following options, that user can set for incremental mode:

S / N size

S / N size option defines the number of bytes of serial value which will be written to buffer. For Bin (binary) serialization modes values 1-4 are valid for S / N size and for ASCII serialization modes values 1-8 are valid for S / N size.

Address

Address option specifies the buffer address, where serial value has to be written. Note that address range must be inside the device start and device end addresses. Address must be correctly specified so the last (highest or lowest) byte of serial value must be inside device start and device end address range.

Start value

Start value option specifies the initial value, from which serialization will start. Generally the max. value for serialization is 1FFFFFFFh in 32 bit long word. When the actual serial value exceeds maximum value, three most significant bits of serial number are set to zero. After this action the number is always inside 0..1FFFFFFFh interval (this is basic style of overflow handling).

Step

Step options specify the increment step of serial value incrementation.

S / N mode

S / N mode option defines the form in which serial value has to be written to buffer. Two options are available:

・ASCII - means the serial number is written to buffer as ASCII string. For example number 0528CDh is in ASCII mode written to buffer as 30h 35h 32h 38h 43h 44h ('0' '5' '2' '8' 'C' 'D'), i.e. six bytes

・Bin - means the serial number is written directly to buffer. If the serial number has more than one byte length, it can be written in one of two possible byte orders. The byte order can be changed in "Save to buffer" item

Style

Style option defines serial number base. There are two options:
・Decimal - numbers are entered and displayed using the characters '0' through '9'

・Hexadecimal - numbers also use characters 'A' through 'F'

The special case is Binary Dec, that means BCD number style. BCD means the decimal number is stored in hexadecimal number, i.e. each nibble must have value from 0 to 9. Values A to F are not allowed as nibbles of BCD numbers.
Note: Select the base in "Style" options before entering numbers of serial start value and step.

Save to buffer

Save to buffer option specifies the serial value byte order to write to buffer. This option is used for Bin S / N mode (for ASCII mode it has no effect). Two options are available:

・LSByte first (used by Intel processors) will place the Least Significant Byte of serial number to the lowest address in buffer

・MSByte first (used by Motorola processors) will place the Most significant Byte to the lowest address in buffer

Split serial number

The option allows to divide serial number into more individual fragments (mostly bytes) and place the bytes at each Nth address of buffer. This feature is particularly useful for SQTP serialization mode for Microchip PICmicro® devices when the device serial number can be the part of program memory as group of RETLW or NOP instructions. For more information see Example 2 shown in Examples section below.

Following split options are available:

- Check box **Split serial number** – turns on/off split function
- **Split gap** – specifies number of bytes placed between split serial number fragments
- **S/N fragment size** – serial number is split into fragments with size specified by this option

Example 1:

Write serial numbers to AT29C040 devices at address 7FFFAH, size of serial number is 4 bytes, start value is 16000000H, incremental step is 1, the serial number form is binary and least significant byte is placed at the lower address of serial number in device.

To make above described serialization following settings have to be set in Serialization dialog:

Mode: Incremental mode

S/N size:	4 bytes
Address:	7FFFCH
Start value:	16000000H
Step:	1
S/N mode:	Bin

Style: Hex

Save to buffer: LS Byte first

Following values will be written to device:

The 1st device
```
   Address      Data
   007FFF0     xx xx xx xx xx xx xx xx xx xx xx xx 00 00 00 16
```
The 2nd device
```
   Address      Data
   007FFF0     xx xx xx xx xx xx xx xx xx xx xx xx 01 00 00 16
```
The 3rd device
```
   Address      Data
   007FFF0     xx xx xx xx xx xx xx xx xx xx xx xx 02 00 00 16
```
etc.

”xx” mean user data programmed to device

Serial numbers are written to device from address 7FFFCH to address 7FFFFH because serial number size is 4 bytes.

Example 2:

Following examples show usage of SQTP serialization mode

Example 2.a use of serialization split with RETLW instructions for

Microchip PIC16F628 devices

Example 2.b use of serialization split with NOP instructions for
Microchip PIC24FJ256 devices

Example 2a:

Use of serialization split with RETLW instructions for Microchip PIC16F628 devices.

Device PIC16F628 has 14 bit wide instruction word. Instruction RETLW has 14-Bit Opcode:

Description		MSB	14-Bit word	LSB		
RETLW	Return with literal in W	11		01xx	kkkk	kkkk

where xx can be replaced by 00 and k are data bits, i.e. serial number byte

Opcode of RETLW instruction is hexadecimal 34KKH where KK is data Byte (serial number byte)

Let’s assume we want to write serial number 1234ABCDH as part of four RETLW instructions to device PIC. The highest Byte of serial number is the most significant Byte. We want to write the serial number to device program memory at address 40H. Serial number split us very useful in this situation. Serialization without serial number split will write the following number to buffer and device:

```
Address    Data
0000080    CD AB 34 12 xx xx xx xx xx xx xx xx xx xx xx xx
```

Note: address 80H is because buffer has byte organization and PIC has word organization so it has equivalent program memory address 40H.
When buffer has word organization x16, the address will be 40H and number 1234ABCDH will be placed to buffer as following:

```
Address    Data
0000040    ABCD 1234 xxxx xxxx xxxx xxxx xxxx xxxx
```

We want to use RETLW instruction so buffer has to be:

Address   Data
0000040   34<u>CD</u> 34<u>AB</u> 34<u>34</u> 34<u>12</u> xxxx xxxx xxxx xxxx

We can do this by following steps:

2a-1. Write four RETLW instructions at address 40h to main buffer (this can be done by hand editing buffer or by loading file with proper content). The bottom 8 bits of each RETLW instruction are not important now, because serialization will write correct serial number bytes at bottom 8 bits of each RETLW instruction.

The buffer content before starting device program will look for example as following:

```
Address     Data
0000040     3400 3400 3400 3400 xxxx xxxx xxxx xxxx
```

8 bits of each RETLW instructions are zeros, they can have any value.

2a-2. Set the serialization options as following:

S/N size:	4 Bytes
Address:	40H
Start value:	1234ABCDH
Step:	1
S/N mode:	BIN
Style:	HEX
Save to buffer:	LS Byte first
Split serial number:	checked
Split gap:	1 byte(s)
S/N fragment size:	1 byte(s)

Split settings described above mean split of serial number by bytes to buffer at every second byte. The correct serial number is set tightly before device programming operation starts.

The buffer content of serial number when programming the first device will be:

```
Address      Data
0000040      34CD 34AB 3434 3412 xxxx xxxx xxxx xxxx
```

The second device will have:

```
Address      Data
0000040      34CE 34AB 3434 3412 xxxx xxxx xxxx xxxx
```

Next devices will have same format of serial number, of course incremented by 1 for each device.

Example 2.b use of serialization split with NOP instructions for Microchip PIC24FJ256 devices

Device PIC24FJ256 has 24 bit wide instruction word. Instruction NOP has code 00xxxxh. Let's assume we want to use serialization in the same manner as SQTP serialization specified in Microchip MPLAB®:

We can do this by following steps:

2b-1. Write NOP instructions (00xxxxh) at address 800h to main buffer of PG4UW. This can be done by hand editing buffer or by loading file with proper content. The address 800h in PG4UW buffer is equivalent to PIC24Fxxx Program memory address 200h. For more details look at Device information in PG4UW for PIC24FJ256 device.

The buffer content with NOPs at address 800h before starting device program should look for example as following:

```
Address    Data
0000800   00 00 00 00 00 00 00 00 xx xx xx xx xx xx xx xx
```

xx – means any byte value

2b-2. Set the serialization options as following:

S/N size:	3 bytes
Address:	800h
Start value:	123456h
Step:	1
S/N mode:	BIN
Style:	HEX
Save to buffer:	LS byte first
Split serial number:	checked
Split gap:	2 byte(s)
S/N fragment size:	2 byte(s)

Split settings described above mean split of serial number into fragments with 16 bit (2 bytes) size to buffer with gap of 2 bytes between fragments. The correct serial number is set tightly before device programming operation starts.
The buffer content of serial number when programming the first device will be:

```
Address        Data
0000800        56 34 00 00 12 00 00 00 xx xx xx xx xx xx xx xx
```

The second device will have:

```
Address        Data
0000800        57 34 00 00 12 00 00 00 xx xx xx xx xx xx xx xx
```

Next devices will have same format of serial number incremented by 1 for each device.

Example 3:

Following example uses the same serialization options as Example number 2a, instead the serial number Split gap is set to 2 and 3.

When Split gap is set to 2 bytes, the buffer content will look as following:

Byte buffer organization:

```
Address    Data
0000080    CD xx xx AB xx xx 34 xx xx 12 xx xx xx xx xx xx
```

Word16 buffer organization:

```
Address    Data
0000040    xxCD ABxx xxxx xx34 12xx xxxx xxxx xxxx
```

When Split gap is set to 3 bytes, the buffer content will look as following:

```
Address    Data
0000080    CD xx xx xx AB xx xx xx 34 xx xx xx 12
```

Word16 buffer organization:

```
Address    Data
0000040    xxCD xxxx xxAB xxxx xx34 xxxx xx12 xxxx
```

Note: When you are not sure about effects of serialization options, there is possible to test the real serial number, which will be written to buffer. The test can be made by following steps:

1 .select wished serialization options in dialog Serialization and confirm these by OK button
2. dialog Device operation options set Insertion test and Device ID check (if available) to Disabled
3. check there is no device inserted to programmer's ZIF socket
4. run Device Program operation (for some types of devices it is necessary to select programming options before programming will start)
5. after completing programming operation (mostly with some errors because device is not present) look at the main buffer (View/Edit buffer) at address where serial number should be placed

Note: Addressing serialization - addresses specified for serialization
are assigned to current buffer organization that control program PG4UW is using for current device. If the buffer organization is byte org. (x8), the Serialization Address will be byte address. If the buffer organization is wider than byte, e.g. 16 bit words (x16), the Serialization Address will be word address.

Device / Device options / Serialization / From file mode

Using the From-file method, serial values are read from the user specified input file(s) and written serialization data to buffer on specified addresses.

There are two basic kinds of From-file serialization depending on format of serialization file used.

1. "Classic" **From-file mode**
   the serialization file has serial values directly included. Serialization data are then read directly from serialization file to buffer on address specified in the file.Classic From-file mode is indicated in main window and info window of PG4UW control program on panel "Serialization" as "**From-file**" serialization. Description of "classic" From-file serialization file is listed in
   "Classic From-file serialization file format" chapter.

2. **From-file mode** from "playlist" file - the serialization file has not serial values directly included. The file contains name list of external files that contain
   serialization data. Serialization data are then read from these external data files, each file means one serialization step (one device programmed). Playlist From-file mode is indicated in main window and info window of PG4UW control program on panel "Serialization" as "**From-file-pl**" serialization. Description of "playlist" serialization file is listed in **"Playlist From-file serialization file format"** chapter.

Software PG4UW selects proper From-file serialization mode automatically, depending on format of user specified serialization file.

Dialog Serialization offers following options for From-file serialization:

File name

File name option specifies the file name from which serial addresses and values will be read. The input file for From-file serialization must have special format, which is described in **From-file serialization file format** below.

Start label

Start label defines the start label in input file. The reading of serial values from file starts from defined start label.

Size of serialization file is limited by free disk space. Recommended maximal number of serial records (items) in one serialization file is 10000 records. More records may cause slower operation when reading serial number before each device programming cycle.

<u>Advanced options for Playlist From-file serialization</u>

Additional operation with used files

This group box contains three types of operation. User can select one of the operation to do with used serialization data files in Playlist From-file mode. Following operation are available:

- **option Do nothing**
  - program does not make any operation with used serialization data files
- **option Move used file to specified directory**
  - program moves used serialization data files to user specified directory of used serialization files
- **option Delete used file**
  - program deletes used serialization data files

Directory

This option is available in playlist From-file serialization mode and selected option *"Move used file to specified directory".* User can specify target directory, into which used serialization data files will be moved.

Following error indicators are used in Playlist From-file serialization:

s/n error #3	- serialization data file does not exist
s/n error #34	- used serialization data file can not be deleted (maybe serialization files are placed on write-protected disk)
s/n error #35	- used serialization data file can not be moved to target directory of used serialization files (maybe serialization files are placed on write-protected disk, or target directory does not exist)

<u>Classic From-file serialization file format</u>

Classic From-file serialization input file has text format. The file includes addresses and arrays of bytes defining buffer addresses and data to write to buffer. Input file has text type format, which structure is:

```
[label1]      addr byte0 byte1 .. byten
  ...
[labeln]      addr byte0 byte1 .. bytem , addr byte0 byte1 ... bytek
              ¥____________________/      ¥__________________/
                         |                          |
                     basic part               optional part

; Comment
```

meaning is:

- **label*1*, label*n*** - labels

  Labels are identifiers for each line of input file. They are used for addressing each line of file. The labels should be unique. Addressing lines of file means, the required start label entered by user defines line in input file from which serial values reading starts.

- **basic part**
  Basic part defines buffer address and array of bytes to write to buffer. Basic part must be always defined after label in line.

- **optional part**
  Optional part defines the second array of bytes and buffer address to write to buffer. One optional part can be defined after basic part of data.

- **addr -**
  Addr defines buffer address to write data following the address.

- **byte*0*..byte*n*, byte*0*..byte*m*, byte*0*..byte*k*** -
  Bytes arrays byte0..byten, byte0..bytem and byte0..bytek are defining data, which are assigned to write to buffer. Maximum count of bytes in one data field following the address is 64 bytes. Data bytes are written to buffer from address addr to addr+n.

  The process of writing particular bytes to buffer is:
  ```
  byte0   to   addr
  byte1   to   addr + 1
  byte2   to   addr + 2
   ....
  byten   to   addr + n
  ```

- **Optional part** is delimited from the first data part by character " , " (comma) and its structure is the same as in the first data part, i.e. address and following array of data bytes.

- **Characters with special use:**
  [ ] - labels must be defined inside square brackets
  ',' – character which delimiters basic part and optional part of data
  ';' - the semicolon character means the beginning of a comment. All characters from „;„ to the end of line are ignored. Comment can be on individual line or in the end of definition line.

Notes:
- Label names can contain all characters except '[' and ']'. The label names are analysed as non case sensitive, i.e. character 'a' is same as 'A', 'b' is same as 'B' etc..
- All address and byte number values in input file are hexadecimal.
- Allowed address value size is from 1 to 4 bytes.
- Allowed size of data arrays in one line is in range from 1 to 64 bytes. When there are two data arrays in one line, the sum of their size in bytes can be maximally 80 bytes.
- Be careful to set correct addresses. Address must be defined inside **device start** and **device end** address range. In case of address out of range, warning window appears and serialization is set to disabled (None).

- Address for Serialization is always assigned to actual device organization and buffer organization that control program is using for current device. If the buffer organization is byte org. (x8), the Serialization Address will be byte address. If the buffer organization is wider than byte, e.g. 16 bit words (x16), the Serialization Address will be word address.

Example;

```
[nav1]   A7890 78 89 56 02 AB CD ; comment1
[nav2]   A7890 02 02 04 06 08 0A
[nav3]   A7890 08 09 0A 0B A0 C0 ; comment2
[nav4]   A7890 68 87 50 02 0B 8D
[nav5]   A7890 A8 88 59 02 AB 7D

;next line contains also second definition
[nav6]   A7890 18 29 36 42 5B 6D , FFFF6    44 11 22 33 99 88 77 66 55 16

;    this is last line - end of file
```

In the example file six serial values with labels „nav1“, „nav2“, ...“nav6“ are defined. Each value is written to buffer on address $A7890. All values have size 6 bytes. The line with „nav6“ label has also second value definition, which is written to buffer on address $FFFF6 and has size 10 bytes, i.e. the last byte of this value will be written to address $FFFFF.

Note:

Address for Serialization is always assigned to actual device organization and buffer organization that control program is using for current device. If the buffer organization is byte org. (x8), the Serialization Address will be byte address. If the buffer organization is wider than byte, e.g. 16 bit words (x16), the Serialization Address will be word address.

Playlist From-file serialization file format

From-file serialization playlist file includes list of filenames which contain serialization data. The file format is similar to classic serialization file format.

Following file format differences are for playlist files:

1. the playlist file must have special header at the first no empty line of file. Theheader is text line in format
   FILETYPE=PG4UW SERIALIZATION PLAYLIST FILE

2. each serial data batch is represented by separate line in format
   [label *x*]   datafilename

   labelx - represents label
   Labels are identifiers for each no-empty line of input file. They are used for addressing each line of file. The labels should be unique within the file. Addressing lines of file means, that the required start label entered by user defines line in input file from which serial values reading starts.

   datafilename - defines name of data file, which contains serialization data. When serialization requires new serial value, the data file will be loaded by standard PG4UW "Load file" procedure to Programmers buffer. File format can be binary or Hex file (Intel Hex etc.). The auto-recognition system recognizes proper file format and forces load of file in the right file format. Data filename is relative to parent (playlist) serialization file.

Example of playlist serialization file:

```
;---- following file header is required    ----------------
FILETYPE=M1883 SERIALIZATION PLAYLIST FILE

;----- references to serialization data files
[nav1] file1.dat
[nav2] file2.dat
[nav3] file3.dat
...

[label n] filex.dat
;-------- end of file   ------------------------
```

For more detailed and fully functional example of serialization type From-file playlist, look the example files placed in the M1883 installation directory in Examples¥ subdirectory as following:

<PG4UW_inst_dir>¥Examples¥Serialization¥fromfile_playlist_example¥
The typical path can look like this:
C:¥Program Files¥MINATO¥M1883¥Examples¥Serialization¥
fromfile_playlist_example¥

You can test the serialization by following steps:
1. start M1883
2. you need to have our programmer connected and correctly found in M1883
3. select wished device, the best are devices with erasable memory, (not OTP memory)
4. select dialog from menu Device **|** Device Options **|** Serialization

5. Set the From-file mode and in the panel From-file mode options select our example serialization file fromfile_playlist.ser
6. click the OK button to accept the new serialization settings
7. run "Program" device operation

You can see at the serialization indicating labels in the main window of M1883 and also in info progress window during device programming and repeating of programming.

Device / Device options / Serialization / Custom generator mode

Custom generator serialization mode provide maximum flexible serialization mode, because the user have serialization system fully in his hands.

When Custom generator mode of serialization is selected, serial numbers are generated by user made program “on-the-fly” before each device is programmed in M1883. Custom generator mode serialization allows user to generate unique sequence of serial numbers desired. Serial numbers can be incremented as a linear sequence or completely non-linear sequence. The user made serial number generator program details are described later in the following section **Custom generator program**.

Examples:

There are also example .exe and C/C++ source files available. The files are placed in the PG4UW installation directory in Examples¥ subdirectory as following:

<PG4UW_inst_dir>¥Examples¥Serialization¥customgenerator_example¥
The typical path can look like this:
C:¥Program Files¥MINATO¥M1883¥Examples¥Serialization¥
customgenerator_example¥

There are following options for Custom generator serialization in PG4UW control software:

In dialog **Serialization** select in Mode panel option **Custom generator mode**.

The following options will be displayed:

Serialization data file

Specifies the path and name for the data file that will contain the current serial number. When device is to be programmed, the PG4UW software calls user made serial number generator that updates the data file. The recommended extension of data file is .dat.

Note: The data file is completely and periodically overwritten during device programming with serialization. Be sure to enter the correct name of wished .dat file. Example: “c:¥serial_files¥serial.dat”

Serialization generator

Specifies the path and name for the executable file which will generate serialization data file.

First serial number

This option is required to specify the initial serial number, that will be passed to custom generator serialization program. The number is entered and displayed in hexadecimal format.

Last serial number

This option specifies the maximum value of serial number allowed. If the value is non-zero, it will be passed to serialization generator program. The generator is responsible for testing the value of last serial number and generate serial .dat file with appropriate error information in the serialization .dat file in case of current serial number greater then last serial number. If the value of Last serial number is zero, the value will not be passed to generator program.

Check box **Call generator with -RESULT parameter after device operation completed**

This new option has special purpose. If there is requirement to call custom generator with special parameter -RESULT, the check box should be checked. Otherwise it has to be unchecked (the default state is unchecked). If checked, custom generator is called by PG4UW control program after each device operation is completed, no matter the result of device operation is OK or Error. Parameters for generator are created by PG4UW serialization engine.

Two parameters are used:

-RESULT[n]=TRUE **|** FALSE   -N<s/n>

-RESULT parameter contains following options: [n] is optional Programmer Site order number, if multiprogramming is used.
TRUE means, that device operation was finished OK.
FALSE means, that Device operation was finished with error.
-N parameter contains serial number, for which the -RESULT is called.

For example call of

```
generator.exe -RESULT=TRUE -N1234
```

means operation was succsessfuly finished for serial number 1234.

Custom generator program

Custom generator program or serialization generator is program that will generate the unique sequence of serial numbers and write the serial data to serialization .dat file. This program is made by user. The path and name of the serialization program must be specified in the Serialization options dialog in Custom generator mode options.

The program will be called from PG4UW every time the new serial data have to be generated. This is usually made before each device programming operation. PG4UW control program passes command line parameters to serialization program and serialization program generates serialization .dat file which is read by PG4UW control program.

Following command line parameters are used:

-N<serial number>

Specifies current serial number.

-E<serial number>

Specifies ending (or last) serial number.

The parameter is only passed when value of Last serial number specified in dialog Serialization in PG4UW software is no zero. The serialization program should return error record T06 in the serialization .dat file, if the current serial number is greater than ending serial number. For details look at section *Serialization .dat file format*.

Serialization .dat file format

Serialization .dat file generated by serialization generator must meet following text format.
Serialization .dat file consists of records and serial data section.

Record is line which begin with one of Txx prefixes as described bellow. Value of “xx” represents the record type code. Records are used to inform PG4UW software about serialization status (current and last serial numbers, serialization data and data format, errors, etc.). Required records are records T01, T02, T03 and T04. Other records are optional.

T01:<serial number>
Contains current serial number value passed to generator by command line parameter -N<serial number>.

T02:<serial number>
Contains next serial number value, that PG4UW will use in next serialization cycle. This value is generated by serialization generator and informs PG4UW,which serial number will follow after current serial number.

T03:<data format code>
Specifies the serialization data format. Following formats are supported now:

T03:50 or T03:55 - ASCII Space data format

T03:99 - Intel Hex / Intel Extended HEX data format
(supports also addresses above 0xFFFF)

T04: - indicates the serialization data will follow from next line to the end of file.

Serialization data are stored in one of standard ASCII data file formats, for example Intel Hex, ASCII Space and so on. The format used for data must be specified by record T03.

Example: Typical serialization data file:

```
T01:000005
T02:001006
T03:99
T04:
:0300000000096B89
:03000300000005F5
:02000C005A0197
:01003F004F71
:00000001FF
```

The file consists of following information:
- line T01 - current serial number 000005h
- line T02 - next serial number 001006h (this value will be used as new current serial number in next serialization cycle)
- line T03 - serialization data format after line T04 is Intel Hex
- line T04 - serialization data, which will be loaded to buffer of PG4UW before

Optional records are:

T05:<message>
Warning or error message. This record causes the serialization is stopped and warning or error message is displayed in PG4UW software.

T06:Current serial number greater than limit
This record causes the serialization is stopped and warning or error message is displayed in PG4UW software. The reason of turning serialization off is the current serial number is greater then allowed maximum ending serial number. This record can be used when -E command line parameter is specified, it means no zero Last serial value in dialog Serialization is specified.

T11:<message>
Less important warning or message. The serialization will not be interrupted.

Flowchart of device programming with custom-generator serialization

When Custom-generator serialization is used, it means, that before each device programming is started, serialization engine calls serialization generator executable, to generate serial .dat file. PG4UW serialization engine manages proper command line parameters for calling of serialization generator. The data from .dat file are immediately read to internal programmer buffer and used as data for programming device. Also next serial number information (record T02) is remembered in PG4UW.

Typical flowchart of device programming is following:

1. Start of programming batch
2. Device insertion test
3. Serialization sequence, consists from four steps:
   - call of serialization generator with proper command line parameters to generate serialization .dat file
   - waiting for serialization .dat file to be available
   - reading of serialization .dat file data to programmer buffer (the data will be used for programming device)
   - delete serialization .dat file after reading of data from it
4. Device programming
5. Device verification
6. Operation result check.
   This is fully managed by PG4UW control program. Serialization generator does not have to do any operation according to operation result. Control program will call serialization generator with required command line parameters.
   OK - PG4UW makes request for next serial number. Next serial number was read from .dat file in step 3. Call of serialization generator will have next serial number specified in command line.
   ERROR - PG4UW does not make request for new serial number. Recent serial number will be used for next device. Next call of serialization generator will have recent serial number specified in command line.
7. Repeat programming with next device?
   Yes - goto step 2.
   No - continue at step 8.
8. End of programming batch

Notes:

In case of error programming result, recent serial number is used, but generator will be called at step 3. anyway, even if the same number is used as for previously programmed device.
If error of serialization .dat file is detected, program PG4UW reports serialization error and stops continuing of programming batch immediately.

Device / Device options / Statistics

Statistics gives the information about actual count of device operations, which were proceeded on selected type device. If one device is corresponding to one device operation, e.g. programming, the number of device operations will be equal to number of programmed devices.

The next function of statistics is Count down. Count down allows checking the number of device operations, and then number of devices, on which device operations have to be done. After each successful device operation the value of count down counter is decremented. Count down has user defined start number of devices to do. When count down value reach zero, it means, specified number of devices is complete and user message about complete count down will be displayed.

Statistics & Count down dialog contains following options:
Mode check boxes
Program, **Verify**, **Blank**, **Erase** and **Read** define operations, after which statistics values increment.

Any selected and performed device operation will increment the **Total** counter and one of **Success** or **Failure** counters depending on device operation result (success or failure).
A combination of partial operations is counted as one operation only.
For example, a Read operation including Verify after Read is one operation.
A Program operation including Erase and/or Verify operations is counted as one operation.

Count down check boxes
Check box **Count down** sets Count down activity (enable or disable). Edit box following the Count down check box defines initial number of count down counter, from which count down starts.

Statistics dialog can be also opened by pressing right mouse button on Statistics panel and clicking displayed item Statistics.

Statistics dialog contains seven statistics values
Success:
Number of operations which where successfully completed
Operational failure:
Number of operations which where not successfully completed due to error of device
Adapter test failure:
Number of operations which where not successfully completed due to incorrect programming adapter
Insertion test failure:
Number of operations which where not successfully completed due to incorrect position of device in programming adapter

ID check failure:

Number of operations which where not successfully completed due to incorrect ID code read from device

Other failure (prog. SW, HW):

Number of operations which where not successfully completed due to hardware error of programmer or control software error **Total** number of all operations

Actual statistics values are displaying in main window of control program in **Statistics** panel.

Statistics panel contains four statistics values

Success:

Number of operations which where successfully completed

Operational failure:

Number of operations which where not successfully completed due to error of device

Other failure:

Number of operations which where not successfully completed due to other reason than device error

Total:

Number of all operations

Count down:

Informs about Count down activity (Enabled or Disabled)

Remains:

Informs about remaining number of device operations to do

Reset Statistics button:

In panel reset statistics values.

Reload Count down button:

In **Statistics** panel reloads initial value to **Count down**.

Note: When new device type is selected, all statistics values are set to zero And **Count down** is set to **Disabled**.
For PG4UW software, the statistics information is saved to Log window when closing PG4UW.

Device / Device options / Associated file

This command is used for setting associated file with current device. This is a file, which can be automatic loaded to buffer after device is selected from default devices select list or by start control program.

You can edit the associated file name in file name box, put a full pathname. The control program checks the present of this file on the disk. Also is possible enabling or disabling automatic load of this file.

You can save both settings i.e. associated file and enabling of automatic load of this file to disk by command **File / Exit and save**.

Device / Device options / Special options

The special terms used here are exactly the terms used by manufacturer of respective chip. Please read the documentation to the chip you want to program for explanation of all used terms.
If the name of this menu item is starting by "View/Edit ...", then the Read device command will read the content of the chip configuration and it can be viewed and edited by this menu command.

Device / Blank check

This command allows to blank check of all devices or its part if possible. The control program reports a result of this action by a write of a warning message to INFO window.

The menu command **Device / Device options / Operation options** allows to set another working area as the standard.

Device / Read

This command allows to read all device or its part into the buffer. The read procedure can also read the content of the chip configuration (if it exists and is readable). The special device configuration areas can be viewed or edited in dialogs available by menu **View / Edit buffer** and menu **Device / Device options / Special options** (Alt+S).

The control program reports a finish of Read action by writing a message to INFO window.

The menu command **Device / Device options / Operation options** allows to set another working area as the standard. Setting an option Verify data after reading in this menu command means a higher reliability for device reading.

Device / Verify

This command compares the programmed data of the all device or its part with data in buffer. The control program reports a result of verify operation to Info window and Log window.

The menu command **Device / Device options / Operation options** allows to set another working area as the standard.

Setting in dialog **General options** (menu **Options / General options**) in tab **Errors** allows to control, how to write the found errors to user specified report file. Also first 45 found errors are written to Log window.

Note:

- Verify operation compares content of the whole chip with the data in the software, therefore it might happen - in case of incomplete programmed chip - the verification after programming shows none error, but solo verify operation does not pass.
- Verify operation can report errors also in case of protected devices, that have active read protection of data.

Device / Program

This command allows to programming of the all device or its part by the data of the buffer. The control program reports a result of this action by a write of an error message to INFO window.

The menu command **Device / Device options / Operation options** allows to set another working area as the standard, and set other operation options for programming process control.

Device / Erase

This command allows erasing the whole programmable device. The program reports the end without error or end with the error by writes the warning report on the display.

The Blank check procedure is applied after Chip erase command for such chips, where doesn't exist other way how to check, the chip is really erased.

Device / Test

This command executes a test of device selected from list of supported devices (for example static RAM) on programmers, which support this test.

The sRAM test is done in 3 basic steps:

1) Test of data drivers functionality.

Drivers test ... test of D0..D7 signals reaction on CE¥, OE¥ and WE¥:
- in first cycle write data 0x55 to the address 0x0 (CE/=L WE/=L OE/=H) and compare with data read from same address (CE/=L WE/=H OE/=L), data have to be valid.
- then other combination control pins (CE/=L WE/=H OE/=H), (CE/=H and WE/=H OE/=L), ..., is set and data have to be not valid - data bus driver have to be inactive.

2) sRAM test, basic part.

Programmer here write random data to sRAM device and then verify the content.

3) RAM test, advanced (optional).

"Walking one" and "Walking zero" are common terms, who need explanation can study:
http://www.google.com/search?q=memory+test+walking+one
http://www.google.com/search?q=memory+test+walking+zero

Notes:

- it is possible to select a delay between write operation and succeeding verify of programmed data (at condition the device is supplied) in intent to detect 'leak' of the bits.
- programmer haven't capability to detect errors like too big current on the signal pins or such "analog" errors
- all tests are done at low frequency (meant compared with maximal speed of tested device), therefore usage of such test is limited

Conclusions:
- the device programmer can provide only basic answer about health of the sRAM
- if you need test sRAM more deeply, use please specialized sRAM tester.

Device / IC test

This command activates a test section for ICs, mainly Standard Logic IC. The ICs are sorted by type of technology to groups/libraries.

First select an appropriate library, wished device and then a mode for test vectors run (LOOP, SINGLE STEP). Control sequence and test results are displayed to LOG WINDOW. In case of need is possible to define the test vectors directly by user. Detailed description syntax and methods of creation testing vectors is described in example_e.lib file, which is in programs installation folder.

Note.
Testing of IC is done using test vectors at some (pretty low) speed. The tests by test vectors can not detect all defects of the chip. Other words, if IC test report "FAIL", then device is defective. But if is "PASS" reported, it mean the chip passed our tests, but still might not pass the tests, that check other - mainly dynamic - parameters of the tested IC.

Because the rising/falling edges of programmers are tuned for programming of chips, it may happen the test of some chips fails, although the chips aren't defective (counters for example).

Device / Jam/VME/...Player

Jam STAPL was created by Altera® engineers and is supported by a consortium of programmable logic device (PLD) manufacturers, programming equipment makers, and test equipment manufacturers.

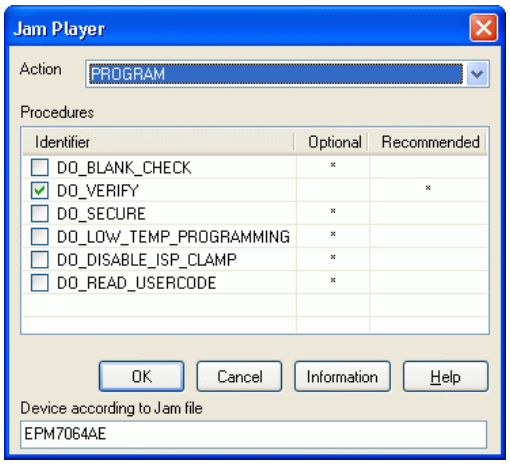
The Jam™ Standard Test and Programming Language (STAPL), JEDEC standard JESD-71, is a standard file format for ISP (In-System Programming) purposes. Jam STAPL is a freely licensable open standard. It supports programming or configuration of programmable devices and testing of electronic systems, using the IEEE 1149.1 Joint Test Action Group (JTAG) interface. Device can be programmed or verified, but Jam STAPL does not generally allow other functions such as reading a device.

The Jam STAPL programming solution consists of two components: Jam Composer and Jam Player.
The Jam Composer is a program, generally written by a programmable logic vendor, that generates a Jam file (.jam) containing the user data and programming algorithm required to program a design into a device.
The Jam Player is a program that reads the Jam file and applies vectors for programming and testing of devices in a JTAG chain.
The devices can be programmed in ZIF socket of the programmer or in target system through ISP connector. It is indicated by [PLCC44](Jam) or (ISP-Jam) suffix after name of selected device in control program. Multiple devices are possible to program and test via JTAG chain: JTAG chain (ISP-Jam)

More information on the website: http://www.altera.com
See please application notes:
"AN 425: Using the Jam Player to Program Altera Devices",
"AN 100: In-System Programmability Guidelines",
"AN 122: Using Jam STAPL for ISP & ICR via an Embedded Processor"
and related application notes for details.

Software tools:
Altera: MAX+plus II, Quartus II, SVF2Jam utility (converts a serial vector file to a Jam file), LAT2Jam utility (converts an ispLSI3256A JEDEC file to a Jam file);
Xilinx: Xilinx ISE Webpack or Foundation software (generates STAPL file or SVF file for use by utility SVF2Jam);
Actel: Actel Libero® Integrated Design Environment (IDE) (generates STAPLE file and/or PDB file), Actel FlashPro (converts a PDB file to STAPLE file).

JAM player dialog


Jam Player

Action: PROGRAM

Procedures

Identifier	Optional	Recommended
☐ DO_BLANK_CHECK	*	
✓ DO_VERIFY		*
☐ DO_SECURE	*	
☐ DO_LOW_TEMP_PROGRAMMING	*	
☐ DO_DISABLE_ISP_CLAMP	*	
☐ DO_READ_USERCODE	*	

Device according to Jam file: EPM7064AE

Jam Player version 2 (see Action and Procedures controls)

Action

Select desired action for executing.
Jam file of version 2 consists of actions. Action consists of calling of procedures which are executed.
Jam file of version 1 does not know statements 'action' and 'procedure', therefore choice Action is not accessible. Program flow starts to run instructions according to boolean variables with prefix DO_something. If you need some new boolean variables with prefix DO_something then contact us.

Procedures

Program flow executes statements from each procedure. Procedures may be optional and recommended. Recommended procedures are marked implicitly. You can enable or disable procedures according to your needs. Jam Player executes only marked procedures. Other procedures are ignored. Number of procedures is different, it depends on Jam file.

Variables

Jam file of version 1 does not know statements 'action' and 'procedure'. Program flow starts to run instructions according to boolean variables with prefix DO_something. Jam Player executes all marked DO_something cases in algorithm. Number of variables (procedures) is constant, it does not depend on Jam file. If you need some new boolean variables with prefix DO_something then contact us.

OK

Accept selected action with appropriate procedures which are marked.

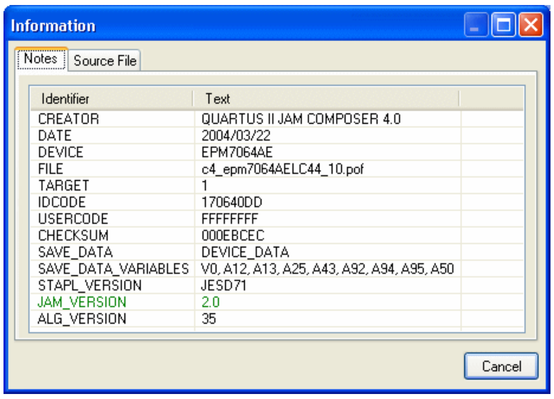
Information

Displays informations about Jam file. You can preview NOTEs and source file in dialog.

Device according to Jam file

File is made for a specific device. Device name is found in Jam file in part NOTE identifier DEVICE. Device name must be identical with name of the device selected in dialog Select device. When devices are different, software will indicate this situation by warning message during start of the Jam Player.

JAM file information dialog



Identifier	Text
CREATOR	QUARTUS II JAM COMPOSER 4.0
DATE	2004/03/22
DEVICE	EPM7064AE
FILE	c4_epm7064AELC44_10.pof
TARGET	1
IDCODE	170640DD
USERCODE	FFFFFFFF
CHECKSUM	000EBCEC
SAVE_DATA	DEVICE_DATA
SAVE_DATA_VARIABLES	V0, A12, A13, A25, A43, A92, A94, A95, A50
STAPL_VERSION	JESD71
JAM_VERSION	2.0
ALG_VERSION	35

Notes: *statements are used to store information about the Jam file. The information stored in NOTE fields may include any type of documentation or attributes related to the particular Jam program.*

Source file contains a program in Jam language. Jam program consists of a sequence of statements. Jam statement consists of a label, which is optional, an instruction, and arguments, and terminates with a semicolon (;). Arguments may be literal constants, variables, or expressions resulting in the desired data type (i.e., Boolean or integer). Each statement usually occupies one line of the Jam program, but this is not required. Line breaks are not significant to the Jam language syntax, except for terminating comments. An apostrophe character (') can be used to signify a comment, which is ignored by the interpreter. The language does not specify any limits for line length, statement length, or program size. More information can be found on the website: http://www.altera.com
Jam file with extension .jbc is Jam STAPL Byte code format which is not visible.

Information about converting JED file to Jam STAPLE file for XILINX devices:

- install Xilinx Integrated Software Environment (ISE) 6.3i software free download: WebPACK_63_fcfull_i.exe + 6_3_02i_pc.exe (315MB or so)
- run Xilinx ISE 6/Accessories/iMPACT
- in dialog “Operation Mod Selection: What do you want to do first?” choose: “Prepare Configuration Files”,
- in dialog “Prepare Configuration Files: I want create a:” choose: “Boundary-Scan File”,
- in dialog “Prepare Boundary-Scan File: I want create a:” choose: “STAPL File”,
- in dialog “Create a New STAPL File” write name of Jam file with extension .stapl,
- in dialog “Add Device” select JED file with extension .jed,
- in the created jtag chain select device e.g.: XC2C32A (left mouse button) and select sequence operation (e.g.: Erase, Blank, Program, Verify; right mouse button),
- in menu select item “Output/Stapl file/Stop writing to Stapl file”
- run PG4UW, select device e.g.: Xilinx XC2x32A [QFG32](Jam), load Jam file (Files of type: select STAPL File)
- choose “Device operation option Alt+O” press button “Jam configuration”. Warning “Select device from menu "Select Devices" and Jam file is probably different! Continue?” choose Yes. (Xilinx sw. does not include line: NOTE "DEVICE" "XC2x32A"; in Jam file). In dialog “Jam player” select action and procedures, finish dialogs, press button “Play Jam” from toolbar and read Log window

Information about ACTEL device programming using STAPLE file

Actel's flash FPGA programming in PG4UW program is performed using Actel Jam player Jam player. This programming solution results in special content toolbar button – Play STAPL, which replace all common operations icon (program, erase, verify...) associated with non Jam programming device.

Operation (program, erase, verify...) with Actel device consists of several following steps.

Loading the *.stp (STAPLE file)

Load the appropriate STAPLE file (generated for example by Actel design software LIBERO IDE)   clicking on main toolbar “Load” icon. The STAPLE file contains the user data and programming algorithm required to program a design into a device.

Selecting an action

After successful loading the STAPLE file, select an intending operation action in Device operation options (Alt+O shortkey)/STAPL configuration... .(STAPL configuration ...). For device programming select PROGRAM from action list. List of all the actions for the programming file with describe can be found in ACTEL FlashPro User’s Guide on <http://www.actel.com>.

Running an action

Click Play STAPL button to run selected action. Successful operation (e.g. programming) is terminated with printout “Exit Code = 0... Success” to log window.

Information about converting PDB file to JAM STAPLE for ACTEL devices

Actel PDB file is a proprietary file format that can be supported by Actel programmers only, e.g. FlashPro programmer. PG4UW control program can program Actel devices only with Jam STAPL file. Therefore a file conversion between PDB and STAPL is necessary.

Converting PDB file to Jam STAPL file for ACTEL devices:

- install software tool FlashPro (component of Actel Libero tool suite or can be downloads from <http://www.actel.com> as a standalone version)
- run FlashPro
- click the New Project button or from the File menu choose New Project and type in the name of your project in the Project Name field. Select desired programming mode – single device or chain and click OK
- from the Configuration menu, choose Load Programming File and select corresponding *.pdb file to convert
- from the File menu, choose Export/Export Single Device STAPL File... Type in file name and click Save button for export STAPL file to the directory you specified
- Conversion of PDB file to STAPL has finish and created *.stp file can be used for programming Actel device.

Frequently asked questions about Actel

Q: How can be identify/verify already programmed Actel device?

A: There are several possible options to get this done. Each option(action) is varying from each other in method of comparing already programmed Actel device with loaded STAPL file. There are the following appropriate mentioned actions in a STP file:
DEVICE_INFO: read and among other things display to log window also the checksum of the programming environment programmed into the device. This value can be manually compared by user with the value in the header of the STAPL file (can be viewed in Information window). Caution: Value of the programmed device checksum isn't counting from existing(maybe corrupted) device data content however this value is stored during programming to

special memory localization and is only reading!
VERIFY_DEVICE_INFO: similar options as previous with difference in automatic comparison of programmed device checksum and STAPLE file checksum. The result of comparison can be either success or error window message.
VERIFY: the safest but the slowest(~tens of seconds depends on device capacity against ~1 second in options 1 and 2) option for data compare programmed device content with content of STAPLE file. Comparison selected family features(FPGA Array, targeted FlashROM pages, security setting...) is executing bit by bit and verification process can be early terminated if data mismatch occurs with writing error message to log window.

Q: Is it possible to program Actel device with two different STAPLE file in one program action in PG4UW?

A: Yes, it is possible. PG4UW control program has built-in multi-project solution for mentioned situation. As an example can be programming data content (first STAPL file) together with security encryption key(second STAPL file).

The ispVM Virtual Machine

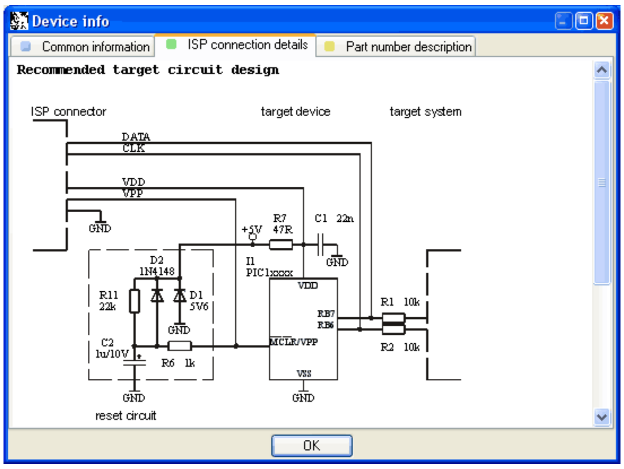
The IspVM Virtual Machine is a Virtual Machine that has been optimized specifically for programming devices which are compatible with the IEEE 1149.1 Standard for Boundary Scan Test. The IspVM EMBEDDED tool combines the power of Lattice's IspVM Virtual MachineTM with the industry-standard Serial Vector Format (SVF) language for Boundary Scan programming and test.

The IspVM System software generates VME files supporting both ispJTAG and non-Lattice JTAG files which are compliant to the IEEE 1149.1 standard and support SVF or IEEE 1532 formats. The VME file is a hex coded file that takes the chain information from the IspVM System window. The devices can be programmed in ZIF socket of the programmer or in target system through ISP connector. It is indicated by [PLCC44](VME) or (ISP-VME) suffix after name of selected device in control program. Multiple devices are possible to program and test via JTAG chain: JTAG chain (ISP-VME).
More information on the website: http://www.latticesemi.com

Software tools:
Lattice: ispLEVER, IspVM System ISP Programming Software, PAC-Designer Software, svf2vme utility (converts a serial vector file to a VME file)

Device / Device info

The command provides additional information about the current device - size of device, organization, programming algorithm and a list of programmers (including auxiliary modules) that supported this device. You can find here package information, part number description and full information for ISP implementation. For example: description of ISP connector pins for currently selected chip, recommended target design around in-circuit programmed chip.



The reserved key **<Ctrl+F1>** will bring out this menu from any menu and any time immediately.

Programmer command

Menu Programmer includes commands used for work with programmers.

Programmer / Find programmer

This item selects a new type of programmer and communication parameters. This command contains following items:

Programmer	- sets a new type of programmer for find. If a **Search all** is selected, the control program finds all supported programmers.
Port	- selects a port, which will be scanned for a requested programmer. If All port is selected, the control program scans all ports, which are available on standard addresses.

Address for special port - sets address of LPT port, if a Special port is selected.

Pressing key **<Enter>** or button **OK** initiates scanning for programmer by set parameters. There is same activity as at start the control program. The command clears a list of default devices without the current device, if the new selected programmer supports this one.

This setting is saved to disk by command **Options / Save options**.

Programmer / Refind programmer

This menu command is used to refind (reestablish communication with) currently
selected programmer.

To select other type of programmer, programmer communication parameters and to establish communication with newly selected programmer use menu **Programmer / Find programmer**.

Programmer / Module options

This option is used for multiple socket programmers for defining MASTER socket and activity of each socket. **MASTER socket** group box allows user to set socket which is preferentially used for device reading operation. **Enable/Disable socket** checkbox array allows user to set enabling and disabling of each socket individually. Disabled sockets are ignored for any device operation.

Programmer / Automatic YES!

This command is used for setting **Automatic YES!** mode. In this mode you just take off the programmed device, then put new device into ZIF socket and a last operation will be repeated automatically. Program automatically detects an insertion of a new device and runs last executed operation without pressing any key or button. An insertion of device into ZIF is displayed on the screen. Repeated operation executing will be canceled by pressing key **<Esc>** during waiting for insert/remove a device to/from ZIF.

Automatic YES!

This mode may be enabled or disabled by item **Automatic YES!** mode. If a new programmer is selected Options / Find programmer, this mode will be disabled.

Response time

The **Response time** is interval between insertion of the chip into the ZIF socket and the start of selected device operation. If longer positioning of the chip in the ZIF socket is necessary select **elongated** response time.

Programming adapter used

Programming adapter used shows name of adapter used with currently selected device.

Pins of programmer's ZIF excluded from sensing

Pins of programmer's ZIF excluded from sensing contains list of pins, that will be ignored from testing by Automatic YES!. The reason to ignore the pins is mostly - capacitors connected to these pins.

Setting Automatic YES! parameters

Button **Setting Automatic YES! parameters** will run wizard that can detect permanently connected pins (pins with capacitors) and set these pins to list of pins excluded from sensing. After selecting of device, list of excluded pins contains default excluded pins for selected device adapter. If other bypass capacitors to universal programmer and/or device adapter are added by customer, there is necessary to run **Automatic YES! parameters wizard** to override default parameters and detect other pins with capacitors.

Device removal hold off time

The **Device removal hold off time** is time period between you removed device from the ZIF socket and the time when software starts to check the socket for new device inserted. This time is in seconds and must be from 1 to 120 (default value is 2 seconds).

Device insertion complete time

In **Device insertion complete time** is possible to set a time within all pins of the device have to be properly inserted after a first pin(s) detected so that the program will not detects incorrectly inserted device. This interval is in seconds and must be from 1 to 120   (default value is 5 seconds).

Suspend on error

The **Suspend on error** defines if the Automatic YES! function will be temporary disabled on error to see result of operation or will going on without suspension.

This setting is saved to disk by command Options / Save options and could be saved into the project file for selected device File / Save project ...

Note:

When using device socket adapters with some passive or active parts, for example capacitors for bypassing supply voltage, the Automatic YES! function may need to know these pins, it could be done by running **Setting Automatic YES! parameters** wizard. This is necessary to make Automatic YES! function working properly. Otherwise Automatic YES! function will "think" the pins are still connected and it will not allow user to insert new device and start new programming.

Programmer / Selftest

Command executes a selftest of current programmer without diagnostic POD. We strongly recommend execute also **Programmer / Selftest plus** of programmer, because Selftest procedure without diagnostic POD is not able to check whole programmer and to discover (if exist) some special errors.

Programmer / Selftest plus

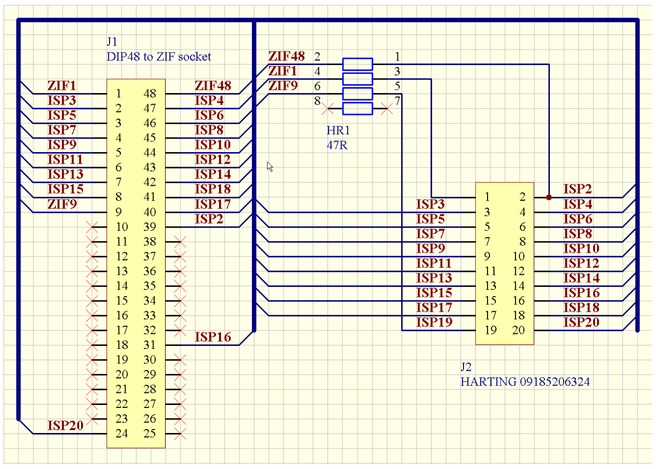
Command executes a selftest of current programmer using diagnostic POD, which is included in standard delivery of programmer.

For optimal results with programmer we recommend you undertake every 6 months.
We recommend run this test as often as possible, e.g. once per month.

Programmer / Self test ISP connector

Diagnostic POD for ISP connectors #2 is used for testing 20 pins ISP connector of programmers. **Diagnostic POD for ISP connector #2** is available as standard accessory for BeeHive208S, BeeHive204, BeeProg2 and BeeProg2C. The order number: 70-0680.

Schematics of Diagnostic POD for ISP connectors #2 (if you are in hurry):



Sequence for testing 20 pins ISP connector:

1. Insert Diagnostic POD for ISP connectors #2 into ZIF socket of the programmer. Diagnostic POD for ISP connectors #2 must be inserted as 48 pins device.
2. Interconnect 20 pins connector of Diagnostic POD for ISP connectors #2 with an ISP connector of the programmer with an ISP cable, included in delivery programmer package. Be sure that pins are interconnected properly (i.e. 1-1, 2-2, ..., 20-20).

3. Run selftest of ISP connector in PG4UW (Programmer / Selftest ISP connector…).

   We recommend run this test every 6 months

Programmer / Calibration test

Command executes test of programmer's calibration values

There are tested voltage levels of TTL drivers, VCCP, VPP1 and VPP2 voltages on each pin of ZIF socket. Result of the Calibration Test can be saved into file and/or printed (for next use).

Option command

The Options menu contains commands that let you view and change various default settings.

Options / General options

General options dialog allows user to control and set variety of PG4UW program options. The options can be saved to PG4UW configuration file when closing PG4UW application, or anytime by command Options / Save options.

/ General options / File options

File options page allows you to set options for erase buffer before loading, auto-reload of current file and recognition method of file formats for loaded files.

Erase buffer before loading option sets **erasing** buffer (with desired value) automatically before loading of data file.

In group **When current file is modified by another process** can be set mode of reloading of actually loaded (current) file. There are three choices:

- Prompt before reloading file
- Reload automatically
- Ignore change scanning of current file
  There are three situations when file modification is tested:
- switching to the control program from another application
- selecting the device operation Verify or Program
- when repeat of last device operation is selected in dialog "Repeat?"

Load file format allows to set mode of file format recognition for loading files.
When automatic file format is selected, program analyses format of loading file and test file for each of supported formats that are available in program. If file format matches one of supported formats, the file is read to buffer in detected format.
Manual file format allows user to select explicitly wished file format from list of supported file formats. File may be loaded no completely or incorrectly, if file format does not match to user selected format.

Check box **Show "Load recent project" dialog on program start** sets the dialog to appear on application PG4UW start. Dialog **Load recent project** contains list of recent projects (project history). User can quickly select and load any of the project from list, or close the dialog without loading of project file.

/ General options / File extensions

File extensions page allows you to set file masks.

File format masks is used for setting file-name masks to use as a filter for file listing in **File / Save** and **File / Load** file window for all file formats. Mask must contain one of wildcards (*, ?) at least and must be applied correctly by syntax.

Note: More masks can be specified for each file format. Semicolon is used as delimiter for extensions.

Example: Motorola: *.MOT;*.S19
Defines two file masks *.MOT and *.S19 - for Motorola file format.

Project file default extension is used for setting project files-extension used as default extension in **File / Load** project and **File / Save** project dialogs.

/ General options / Buffer

This page allows you to select **Erase buffer before selecting of new device** action. This can be useful for some kind of special devices, which require exact type of data at certain addresses, and the data are not part of data file loaded to buffer for this device.

Buffer can be erased (filled) with default "blank" value for selected device or with custom-defined value. This can be controlled by selection group box **Erase value** and **Custom erase value** edit field.

Notes: We do not recommend to use this function for large devices (more than 8 MB) because it can consume more time to make buffer erase. The setting is saved to PG4UW configuration file. It is not saved to project file.

/ General options / Language

This page allows you to select another language for user interface such as menu, buttons, dialogs, information and messages. It also allows to select wished help file in another language. For another language support of user interface the language definition file is required.

/ General options / Sound

Panel **Sound settings** page allows user to select the sound mode of program. Program generates sounds after some activities, e.g. activities on device (programming, verifying, reading, etc.). Program generates sound also when warning or error message is displayed. User can now select sound from Windows system sound (required installed sound card), PC speaker or none sound.

Panel **Allow sound for following actions** contains following options:

- Check box **Successful operation**
When checked, sound will be generated after device operation successfully

completed.
When unchecked, no sound will be generated after successful device operation.

- Check box **In case of error**
  When checked, sound will be generated after device operation is finished with error.
  When unchecked, no sound will be generated after device operation finished with error.

In the panel **Programmer internal speaker sound settings** is possible to set sound options for some programmers with built-in internal speaker. Sound beeps are then generated from internal programmer speaker after each device operation for indicating device operation result – good or bad result.

/ General options / Errors

This option allows to set a device verify errors saving to file. When verify errors occur, first 45 differences are written to Log window. If user wants to save the verify errors (data differences) to file, he can set options in section **Save device verify errors to file** to one of two methods: cumulate errors from all verify actions to the same file or save errors to file just from last verify action. Verify errors will be saved to file with name specified by **Error file name** edit box. Following error report file options are available:

- option **No** (default) verify errors saving to file is disabled. Errors are displayed just on screen

- option **New** save verify errors to file just from last verify action. Before first write of new verify action is file deleted and created as new one
- option **Append** verify errors from all verify actions are cumulated into the same file. If file does not exist, the new file will be created

Box **Error report file size limit** contains settings that allow to set max. number of verify errors saved to file. It contains following options:

- Check box **Stop verification after max. number of errors reached**
  If checked, verify action will finish after **Max. number of errors** will be written in file.
  If not checked, all verify errors are saved to the file.
- Edit box **Max. number of errors** specifies number of verify errors, that can be written to error file in one verify operation.

/ General options / Log file

This options associates with using of **Log window**. All reports for Log window can be written into the **Log file** too. The Log file name is "Report.rep" as default. The control program creates this file with name and directory specified in **Log file name** edit box.

Following Log file options are available:

- **No** default, content of Log window is not copied to Log file, i.e. all reports will be displayed to Log window only
- **New** deletes old Log file and creates new one during each start of control program
- **Append** adds Log window reports into existing Log file, If file does not exist, the new file will be created

Checkbox **Add date information to Log file name** allows user to set date information into Log file name specified by user in Log file name edit box. When the checkbox is checked, program automatically adds current date string into user specified Log file name by the following rules:

If user specified log file name has format:
<user_log_file_name>.<log_file_extension>

The name with added date will be:
<user_log_file_name><-yyyy-mmm-dd>.<log_file_extension>

The new part representing of date consists of yyyy - year, mmm - month and dd - day.

Example: User specifies Log file name: c:¥logs¥myfile.log
The final log file name with added date will look like this (have a date November, 7th, 2006):
c:¥logs¥myfile-2006-nov-07.log

If do you wish to have log file name without any prefix before date information, you can specify the log file name as:
.<log_file_extension> - dot is the first in file name

Example: User specifies Log file name: c:¥logs¥.log
The final log file name with added date will look like this (have a date November, 7th, 2006):
c:¥logs¥2006-nov-07.log

Advanced options about **Log file size limit** are available too.

- option **Use Log file text truncating when file size limit is reached** - when checked, the Log file size limit is on. It means, that when Log file size reaches specified value, the part of text included in Log file will be truncated. When the option is unchecked, the size of Log file is unlimited, respectively is limited by free disk space only.
- option **Maximum Log file size** specifies the maximum size of Log file in kBytes.

- option **Amount of truncated text** specifies the percentage of Log file text, which will be truncated after Maximum Log file size is reached. The higher value means more text will be truncated (removed) from Log file.

The Log file settings can be saved to disk by command **Options / Save options**.

/ General options / Job Report

Job Report represents the summary description of operation recently made on device. Job is associated with project file and it means the operation starting with Load project until loading of new project or closing program PG4UW.

Job Report contains following information:

- project name
- project date
- Protected mode status
- PG4UW software version
- programmer type and serial number
- start time of executing the Job (it means time when Load project operation was performed)
- end time of executing the Job (time of creating the Job Report)
- device name
- device type
- checksum
- device operation options
- serialization information
- statistics information

Job Report is generated in following cases:

- user command Load project is selected
- closing or disconnecting programmer sites is selected
- closing the PG4UW
- device Count down counter reaches 0 (finished status)
- manually by user, when menu "File **|** Job Report" is used

The Job Report is generated for recently loaded project file, only when statistics value of Total is greater than 0.
It means, at least one device operation (program, verify,...) must be performed.

Following options are available for Job Report:

Checkbox **Enable Job Report function -** when checked, the Job Report function is active (enabled). Otherwise the Job Report function is disabled.

Checkbox **Automatically save Job Report file -** when checked, the Job Report will be saved automatically to directory specified in edit field Job Report directory and with file name created as following:

job_report_<ordnum>_<prjname>.jrp

where
<ordnum> is decimal order of the file. If there exist any report files with the same name, then order for new report file is incremented about order of existing files.
<prjname> is project file name of recently used project, and without the project file name extension.

Example 1:
Let's use the project file c:¥myproject.eprj and directory for Job Report set to d:¥job_reports¥. There are no report files present in the Job Report directory.

The final Job Report file name will be:
d:¥job_reports¥job_report_000_myproject.jrp

Example 2:
Let's use the conditions from Example 1, but assume there is already one report file present. Name of this file is
d:¥job_reports¥job_report_000_myproject.jrp

The final Job Report file name of new report will be:
d:¥job_reports¥job_report_001_myproject.jrp

Note, the order inside file name is incremented by 1.

When **Automatically save Job Report file** setting is set, no Job Report dialogs appears when generating Job Report. Newly generated Job Report is saved to file without any dialogs or messages (if no error occurs while saving to file).

If the checkbox **Automatically save Job Report file** is unchecked, the PG4UW will show Job Report dialog every time needed.
In the Job Report dialog user can select operation to do with Job Report. If user selects no operation (Close button), the Job Report will be written to PG4UW Log Window only.
Example of typical Job Report dialog is shown bellow:

/ General options / Automatic YES!

Allows user to override default settings (as preset in PG4UW software) of indication for the state when the programmer and the software wait for withdrawing programmed device and a new one will be inserted in active Automatic YES! mode.

Default (as preset in software) - the programmer indicates the state when a device is programmed and the programmer with software wait for inserting a new device as preset in the software for respective programmer. Multi-sockets programmers (the programmers with more than one ZIF socket) do not indicate this state, see description for **Not indicated (quiet mode)**. Single-socket programmers (the programmers with one ZIF socket) indicate this state by LED Busy blinking, see description for **By LED Busy blinking** setting.

Not indicated (quiet mode) – the programmer, regardless of the number of ZIF sockets of the programmer, does not indicate the state when a device is programmed and the programmer with software wait for inserting a new device. After an operation with a device only one of the status LEDs Error or OK lights, in dependence on the result of previous operation. This LED goes off immediately after detecting removal of a device from the ZIF socket.

By LED Busy blinking - the programmer, regardless of the number of ZIF sockets of the programmer, indicates the state when a device is programmed and the programmer with software wait for inserting a new device mode by blinking with the LED Busy. After an operation with a device is done, one of the status LEDs (OK or Error) lights, in dependence on the result of previous operation and the LED Busy is blinking. If the program detects removal of a device from ZIF socket, then the status LED goes off, but the LED Busy is still blinking to indicate readiness of the program to repeat last operation with new device. After the program indicates one or more pins of (new) device in the ZIF socket, the LED Busy goes light continually. From this point the program waits a requested time for insertion of the rest pins of new device. If a requested time (**Device insertion complete time**) overflows and a device is not correctly inserted, the program will light the LED Error to indicate this state. When new device is inserted correctly, the status LED goes off and a new operation with device is started.

/ General options / Remote control

Remote control of PG4UW control program allows to control some functions of PG4UW application by other application. This is very suitable feature for integrating device programmer to mass-production handler system or other useful application.

Remote application that controls PG4UW acts as Server. Program PG4UW acts as Client. Communication between PG4UW and remote control program is made via TCP protocol - this allows the PG4UW to be installed on one computer and remote control application to be installed on another computer, and these computers will be connected together via network.

Default TCP communication settings for remote control are:

Port: **telnet**   Address: **127.0.0.1** or **localhost**

Address setting applies for PG4UW (Client) only. Port setting applies for PG4UW (Client) and also for Server application.

Default settings allow to use remote control on one computer (address localhost). PG4UW (Client) and remote control Server have to be installed on the same computer.

Note: If firewall is installed on system, firewall can display warning message when remote control Server or Client is starting. When firewall is showing warning with question asking to allow or deny network access for remote Server or Client, please select 'Allow' option, otherwise remote control will not work. Of course you can specify in firewall options more strict rights to allow remote Server/Client access on specified address and port only.

For more information about remote control of PG4UW and demonstration remote control applications, please see the application note **remotemanual.pdf** placed in subdirectory ¥RemoteCtrl which is in the directory, where PG4UW is installed. Manual for remote control is available also from Windows Start / Programs menu link to Remote manual, created during PG4UW installation.

/ General options / Save options

Save options Page allows you to select the program options saving when exiting program. Three options are available here:

Don't save	don't save options during quitting program and don't ask for saving options
Auto save	save options during quitting program without asking for saving options
Prompt for save	program asks user for saving options before quitting program. User can select to save or not to save options

/ General options / Other

Page **Other** allows user to manage other program settings.

Panel **Application priority** allows user to set the priority of the program. Priority settings can affect performance of programmer (device programming time), especially if there are running more demanding applications in the system. Please note that setting application priority level to Low can significantly slow down the program.

In the panel **Tool buttons**, hint display options on toolbar buttons in main program window can be modified. In the panel **Start-up directory** can be selected mode of selecting directory when program starts. **Default start-up directory** means directory, from which program is called. **Directory in which program was lastly ended** means the last current directory when program was lastly ended. This directory assumes the first directory from directory history list.

Colors of the work result LEDs of programmer:

Standard color scheme (ERROR=red, BUSY=yellow)
Former color scheme (ERROR=yellow, BUSY=red)

Note: These settings are available only for newer types of programmers. If you can't see mentioned settings in menu, or menu is not enabled for editing, your programmer doesn't support **LED color scheme** customization.

Colors of the work result indication in the software:

Standard color scheme (ERROR=red, BUSY=yellow)
According to LEDs on the programmer (ERROR=yellow, BUSY=red)

Note: These settings are available only for older types of programmers.

Options / View

Use the View menu commands to display or hide different elements of program environment such as toolbars.
Following toolbars are available now:

Options / View / Main toolbar
Choose this command to show or hide the Main toolbar.

Options / View / Additional toolbar
Choose this command to show or hide the Additional toolbar.

Options / View / Device options before device operation
Choose this command to enable/disable display of Device options before device operation is confirmed.

Options / Protected mode

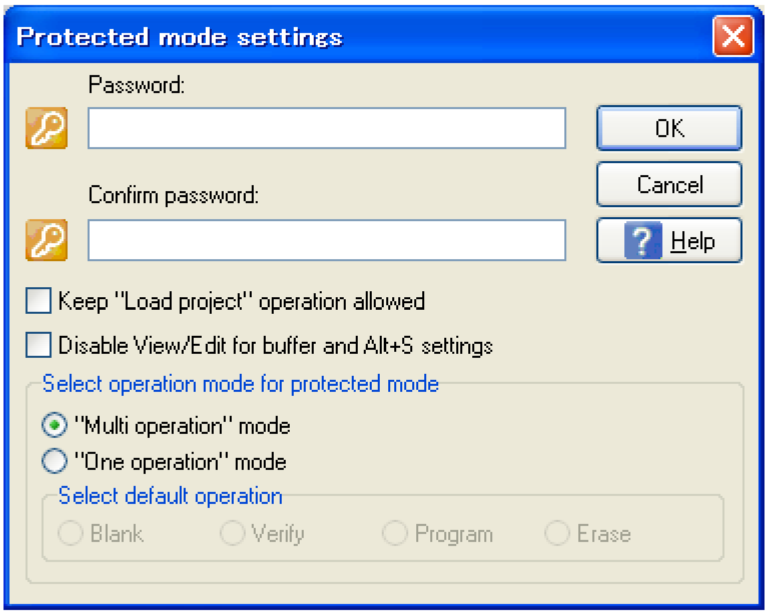
Protected mode is special mode of program. When program is in Protected mode, there are disabled certain program operation and commands that can modify buffer or device settings. Protected mode is used for prevent operator from modify buffer or device settings due to insignificance. Protected mode is suitable for the programming of a large amount of the same type of devices. Protected mode function is available independently in single programming control software PG4UW.

Protected mode in PG4UW

There are two ways how to switch program PG4UW to **Protected mode**:

1. by using menu command **Options / Protected mode**. This command displays password dialog. User has to enter password twice to confirm the password is correct. After password confirmation program switches to Protected mode. The entered password is then used to switch from Protected mode back to **Normal mode** mode.

2. by reading project, which was previously saved as protected (Protected mode project). For details see File / Save project.**File / Save project**.


Protected mode settings

Password:

Confirm password:

[ ] Keep "Load project" operation allowed

[ ] Disable View/Edit for buffer and Alt+S settings

Select operation mode for protected mode

[✓ "Multi operation" mode] "One operation" mode

Select default operation

Blank Verify Program Erase

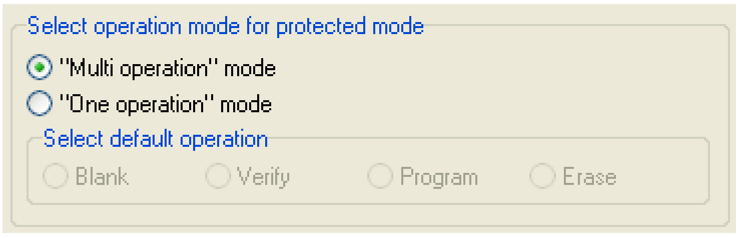
Checkbox **Keep "Load project" operation allowed** is set to inactive state by default - it means the Load project operation button and menu will be disabled when Protected mode is active.
If the option is enabled (checked), the Load project operation button and menu will be allowed in Protected mode.

Checkbox **Disable View/Edit for buffer and Alt+S settings** is set to inactive state by default - it means the View/Edit buffer button and menu will be

enabled when Protected mode is active. This allows you and others to view content of buffer and Alt+S settings, but not edit (due to active Protected mode).
Activate this option, if you wish to disable also viewing of buffer content in Protected mode. In this case, we recommend to activate also option **Encrypt project file (with password).** For details see File / Save project.

Select operation mode for protected mode

Options **"Multi operation" mode** - represents basic form of protected mode, where all available device operations (blank, verify, program, erase) are enabled, except read. This provides certainty, that operator cannot modify buffer data by accidental or intentional read operation. It's useful when you want to have all supported device operations enabled in one project (multi-project).



Select operation mode for protected mode
[✓ "Multi operation" mode]
"One operation" mode
Select default operation
Blank   Verify   Program   Erase

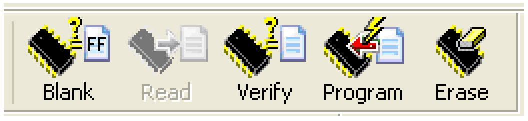
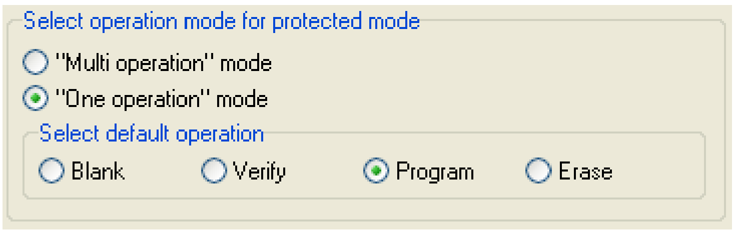


Fig. Project saved in **"Multi operation" mode**,
all (but read) **device operations** are enabled

Options **"One operation" mode** - represents enhanced form of protected mode, where only one operation from all available is enabled. Provides better certainty, because prevents operator from executing wrong type of device operation.



Select operation mode for protected mode
"Multi operation" mode
[✓ "One operation" mode]
Select default operation
Blank   Verify   [✓ Program]   Erase

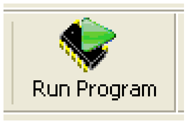


Fig. Project saved in **"One operation" mode,**
only one device operation is enabled

To **switch** program from Protected mode **to Normal mode** use the menu command Options/Normal mode. The "Password required" dialog appears. User has to enter the same password as the password entered during switch to Protected mode.

Other way to **cancel Protected mode** of program is to **close the program**. Next time the program starts in Normal (standard) mode (the only exception is case of project loaded by command line parameter with name of project which was saved in Protected mode).

When Protected mode is active, the software indicates this by label

Protected mode

in right top corner of Programmer activity log.

If you search information about another option **Require project file unique ID before first programming**, indicated by label **(ID)** next to project file name in bottom status line of control program, please take a look at chapter File / Save project.

Multi-projects

Multi-project is special feature which provides possibility to run **any sequence** of operations **with any device**, based on informations saved during creation of **sub-projects** and **multi-project** itself.

In practice, using Multi-projects you are able to:

- comfortably program multi-chip devices
- configure and run any sequence of device operations (e.g. Program + Verify + Verify + Verify) with one device

See also more detailed description on operation modes.

Basic terms related to Multi-project:

- **Multi-project file** is special file that contains all **Multi-project** information. Multi-project file can include one or more projects. Projects included in Multi-project (file) are also called **sub-projects**.

- **Sub-project** means classic project file which has been included into Multi-project file during Multi-project file build.

- **Project file** - a special type of file, that combines buffer data, device operation options, special options and some level of safety features. It completely defines the way how to treat with the device. Once saved, it can be reloaded anytime and the operation can be repeated exactly.

- **Multi-chip device** is device with two or more independent chips (of the same or various types) in single package.

- **Sub-device** - an individual part of multichip device. Sub-device is selectable from PG4UW device list. Once selected, you can work with respective chip in fully manner. You can define, test and save the project file for the partial chip.

- **Master device -** a multichip device unit, consists of sub-devices. Master-device is selectable from PG4UW device list, too. Once selected, you can use Multi-project Wizard to build-up the Multi-project file from individual project files and save/load/execute it. Master device is not defined if the Multi-project is built up from Single-chip devices.

- **Device operation -** each operation executable directly selecting via menu, clicking on toolbar button or callable via remote command (Blank, Read, Verify, Program, Erase). Some of these operations (especially Program and Erase) may contain embedded sub-operations, editable via Menu/Device/Device options.

- **Multi-project Wizard** - an assistant for Multi-project file building. The Wizard allows user to select projects that have to be included in Multi-project and save them to one Multi-project file. Process of saving selected project files to one Multi-project file is called Multi-project file building. The Wizard also allows to start device operation according to projects (sub-devices) included in Multi-project. More information about **Multi-project Wizard** is described bellow.

Options / Multi-project Wizard

Multi-project device operation requires Multi-project file, which contains partial sub-projects associated to sub-devices (chips) of Master device. Multi-project file can be created in Multi-project Wizard. The Wizard has following main functions:

- Select of sub-projects and build final Multi-project file
- Load of existing Multi-project file *1
- Start device operation of recent Multi-project

Note *1: Existing Multi-project file can be loaded from main menu of PG4UW using menu File | Load project or from Multi-project Wizard by Load multi-prj command.

Multi-project Wizard contains following controls:

- Button **Load multi-prj** is used for load of existing Multi-project file.
- Button **Build Multi-project** is used for build of new Multi-project file, which uses projects listed in table Sub-projects.
- **Table 1: Sub-projects** contains list of projects, that are included in recent Multi-project.
- Button **Add project** is used for adding of new project file(s) to list of project files in Table1.
- Button **Remove project** is used for removing of selected project file from list of project files in Table 1.
- Buttons **Move up a Move down** are used for moving of selected project in Table 1 one position up or down. Projects are processed in specified sequence order, the upper-most (#1) as first.
- Button **Help** show this help.
- Buttons of device operation **Blank, Verify, Program, Erase, resp. Run** are used for running the selected device operation on devices (sub-devices) listed in table Sub-projects.
    - In **"Multi operation" mode**, one of all available operations can be run at a time (the same operation on each sub-device).
    - In **"One operation" mode**, only one operation can be run (the same operation on each sub-device) or each subproject can run it's own (one) operation, depending on projects the Multi-project consists of. See also more detailed description on operation modes.

Notes:

- serialization is not supported in multiprogramming mode (only single programming supports serialization) - count-down function is not supported now

Using Multi-project to program Multi-chip devices

Two following basic actions have to be performed when using Multi-project to program Multi-chip devices (similar also for Single-chip devices):

(A) Making (building) of Multi-project (or Multi-project file)
(B) Using of Multi-project for running of device operation

1. Making (building) of Multi-project (or Multi-project file)

Following steps are recommended when making Multi-project file:

1-a. Create "classic" projects, one project for each sub-device of multichip device.
Projects are created in the same way as projects for generic devices:
- select sub-device according to required chip of multichip device *1
- set device parameters, settings, and load required device data to buffer by **Load file** command in PG4UW
- optionally make test of device operation by running the device operation on device
- if everything is OK, the project file can be created by **Save project** command

1-b. Select Master multichip device, the Multi-project has to be used for.
After selection of multichip device, Multi-project Wizard is automatically opened.

1-c. In Multi-project Wizard add required projects by **Add project button.**
Each project represents one sub-device of multichip device.

1-d. After completing of sub-project selection, use button **Build Multi-project** to create final Multi-project file. Program will prompt for name of new Multi-project file. Final Multi-project file will contain all sub-projects listed in Table 1: Sub-projects.

Notes:
There is possible to create Multi-project from any classic project files. So association with Master device is not mandatory. It is only on user's consideration how to combine correct sub-devices (sub-projects) into one Multi-project. This feature can be especially useful when using ISP programming of devices in JTAG chain with different projects defined.

Multi-project Wizard can be opened by one of following actions:

- selecting of Master multichip device from Select Device dialog in PG4UW
- loading of created **Multi-project file**
- opening dialog **Multi-project Wizard** directly from PG4UW menu Options | Multi-project Wizard

*1 Convention for Master-device and Sub-device part names in PG4UW device list:

Master-device: Multichip_original_part_name [package_type]
Sub-devices: Multichip_original_part_name [package_type] (part1)
Multichip_original_part_name [package_type] (part2)
...
Multichip_original_part_name [package_type] (part n)

Example:
Master-device: **TV0057A002CAGD [FBGA107]**
Sub-devices **#1 TV0057A002CAGD [FBGA107] (NAND)**
#2 TV0057A002CAGD [FBGA107] (NOR)

2. Using of Multi-project for running of device operation

Typical usage of existing Multi-project file has following order.

For single programming in PG4UW:

2-a. Load created Multi-project by **File | Load project** menu command in PG4UW main window or **Load multi-prj** button in Multi-project Wizard. After successful loading of Multi-project, Multi-project Wizard is opened automatically.

2-b. In Wizard run wished device operation using one of available device operation buttons (Blank, Verify, Program, Erase), mostly **Program** device operation is used. Selected device operation is executed as sequence of sub-project loading and consequent sub-device programming for each sub-device defined in Multi-project. And this is main purpose of Multi-project - to automate running sequence of device operations for each chip of multichip device. The side effect of this concept is, that device progress indicators are reset to 0 at beginning of each sub-device operation, so it looks like progress bar is "jumping" to 0 few times while multichip operation is running.

2-c. After programming of all sub-devices is completed (or error occurs), standard "Repeat" dialog is displayed. Programmed device can be removed from programmer socket and new device can be inserted. Pressing Yes button in dialog Repeat or YES! button on programmer *, will

start multichip device programming sequence again.
* If Automatic YES! function is turned on, no Repeat dialog is displayed after device operation is completed, but Automatic YES! window will appear. The window shows status of programmer socket and notice about removing of programmed device and inserting of new device to programmer socket. After inserting of new device, multichip device operation sequence will start automatically. For more details about Automatic YES! function, please take a look at Programmer / Automatic YES!.

Notes:

- serialization is not supported in multiprogramming mode (only single programming supports serialization)
- count-down function is not supported now

Options / Save options

This command saves all settings that are currently supported for saving, even if auto-save is turned off. Following options are saved: options under the Options menu, ten last selected devices, file history, main program window position and size.

Help command

Menu **Help** contains commands that let you view supported devices and programmers and information about program version too.

Pressing the **<F1>** key accesses the Help. When you are selecting menu item and press **<F1>**, you access context-sensitive help. If PG4UW is executing an operation with the programmer **<F1>** generates no response.

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Help / Supported devices

This command displays list of all devices supported by at least one type of all supported programmers. It is useful especially when user wants to find any device supported by at least one type of programmers.
Prefix ”g_” before name of device means the device is supported by multi-socket programmer.

Help / Supported programmers

This command displays information about programmers, where supported this program.

Help / Device list (current programmer)

This command makes a list of all devices supported by current programmer and saves it to **?????DEV.txt** text file and **?????DEV.htm** HTML file in the directory where control program is run from. Marks ????? are replaced by abbreviated name of current programmer, the device list is generated for.

Help / Device list (all programmers)

This command makes device lists for all programmers and saves them to **?????DEV.TXT** text files and **?????DEV.HTM** HTML files in the directory where control program is running from. Characters ????? are replaced by abbreviated name of programmers, the device lists are generated for.

Note: The control program loses all information about current device after this command is executed. Reselect wished device again by any of select methods in menu DEVICE.

Help / Device list (cross reference)

This command makes cross reference list of all devices supported by all programmers available on market and supported by this control program. The resulting list is in HTML format and consists of following files:

- one main HTML file **TOP_DEV.htm** with supported device manufacturers listed
- partial HTML files with list of supported devices for each device manufacturer

Main HTML file is placed to directory where this control program for programmers is located.

Partial HTML files are placed to subdirectory **DEV_HTML** placed to the directory where control program for programmers is located.
HTML placed to the directory where control program for programmers is located.

Help / Create problem report

Command Create problem report is used for writing more particular diagnostic information to Log window and consequently copy Log window content to clipboard. The Log window content can be placed from clipboard to any text editor. Problem report is useful when error occurs in control program or programmer and kind of the error is, that user can not resolve it oneself and he must contact programmer manufacturer. In this case when customer send message to manufacturer about his problem it is good to send also problem report. Problem report can help manufacturer to localize the reason of error and resolve it sooner.

Help / About

When you choose the Info command from the menu, a window appears, showing copyright and version information.

Warranty terms

The manufacturer, MINATO ELECTRONICS INC..gives a guarantee on failure-free operating of the programmer for one-year (M1883) from the date of purchase. If the product is diagnosed as defective, MINATO ELECTRONICS INC. or the authorized repair center will repair or replace defective parts at no charge. Parts used for replacement and/or whole programmer are warranted only for the reminder of the original warranty period.

For repair within the warranty period, the customer must prove the date of purchase.

This warranty terms are valid for customers, who purchase a programmer directly from MINATO ELECTRONICS INC. The warranty conditions of MINATO ELECTRONICS INC. sellers may differ depending on the target country law system or MINATO ELECTRONICS INC. seller’s warranty policy.

The warranty does not apply to products that are of wear and tear or mechanically damaged. Equally, the warranty does not apply to products opened and/or repaired and/or altered by personnel not authorized by MINATO ELECTRONICS INC., or to products that have been misused, abused, accidentated or that were improperly installed.

For unwarrantable repairs you will be billed according to the costs of replacement materials, service time and freight. MINATO ELECTRONICS INC. or its distributors will determine whether the defective product should be repaired or replaced and judge whether or not the warranty applies.