FLOWCODE 7

Smarter programming

Datasheet

Contents

What is Flowcode?

Flowcode allows users to develop complex electronic and electromechanical systems with ease.

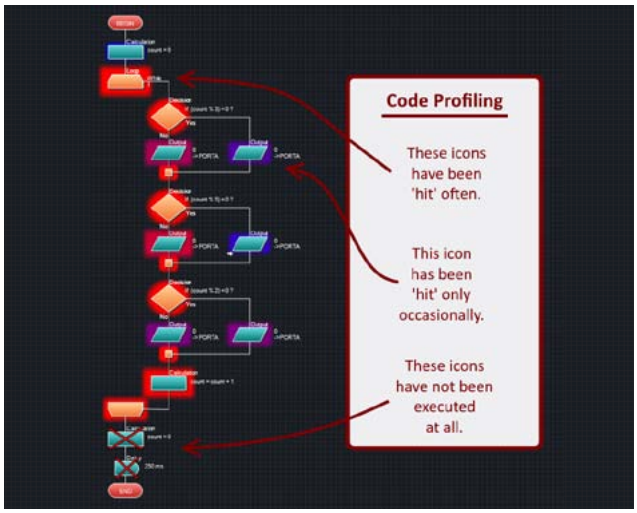
Flowcode is an advanced integrated development environment (IDE) for electronic and electromechanical system development. Engineers - both professional and academic - use Flowcode to develop systems for control and measurement based on microcontrollers or on rugged industrial interfaces using Windows compatible personal computers.

A 2D and 3D graphical development interface allows students to construct a complete electronic system on-screen, develop a program based on standard flowcharts, simulate the system and then produce hex code for programming a range of devices including Microchip's PIC MCU; 8bit, 16bit and 32 bit, as well as Atmel AVR, Arduino and ARM devices.

Flowcode version 7 has a number of new developments which provide a fast and effective way to write complex projects for embedded systems. With a flexible licencing structure, including a free version of Flowcode, which is excellent for learning programming, developing applications at home or for prototyping designs, users can build a bespoke licence perfect for their embedded system development requirements by visiting **our website.** This datasheet presents a number of features and advantages of using Flowcode, support and licencing information plus further info on target device support and components that can be found in the latest version.

- Flowcode's graphical programming language makes it easy for those with minimal programming experience and gives professional engineers a fast environment in which to develop complex systems.
- Users are fully supported through the Matrix forums, a range of free resources including a wiki-site, and through the opportunity to take advantage of Matrix's professional services.
- Code-porting is made easy with Flowcode, as users can work with multiple target devices and can easily switch devices mid-way through their projects.

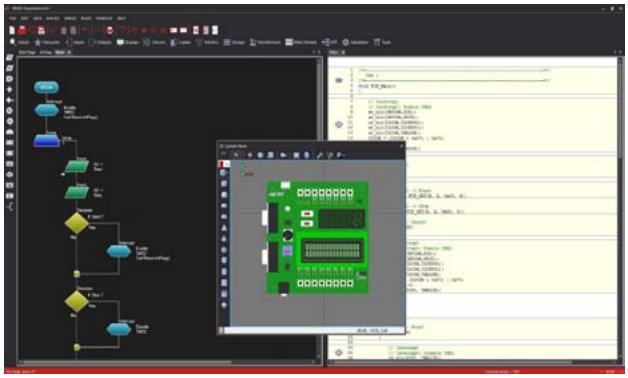
Flowcode 7's easy-to-use and modern UI is perfect for developing electronic systems for users in education or developing professionals.



Flowcode 7 boasts a range of brand new features (including code profiling) which make it the development environment of choice for thousands of academic institutions worldwide and thousands more professional engineers.

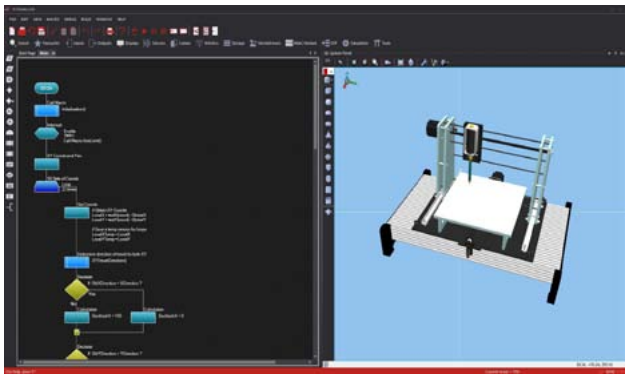
Design

Electronic engineer



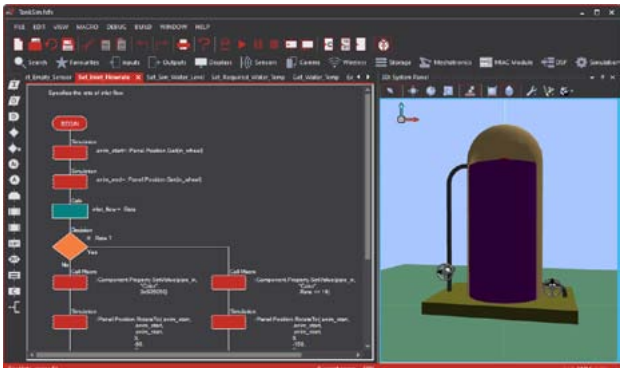
Design a virtual circuit board with PCB level components that connect to a virtual microcontroller and develop the program using flowcharts.

Electromechanical engineer



Develop a mechanical system in Solidworks and characterise it for Flowcode. Develop a flowchart program for control and operational data conditioning.

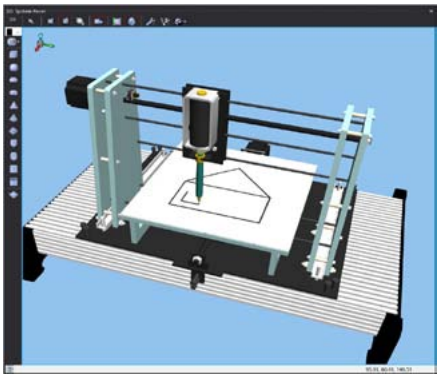
Test engineer



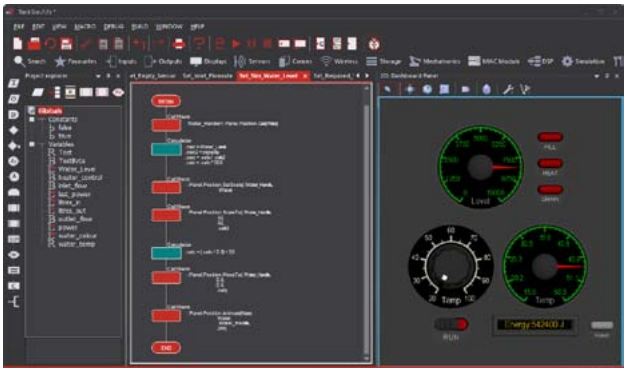
Develop a mathematical and/or physical model of your system, and develop a flowchart control program using Flowcode.

Simulate

Simulate the program and circuit board components to check function using LEDs, displays to see function and interacting with virtual switches to control the system.

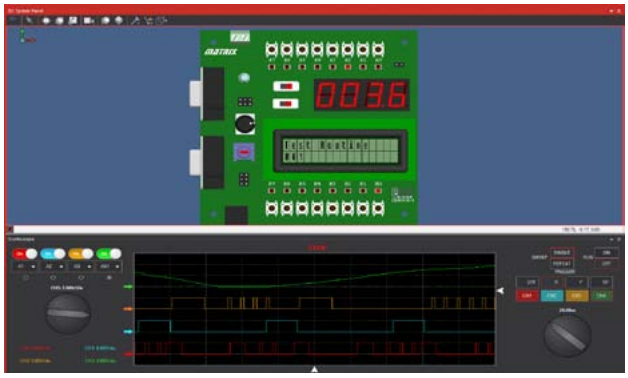


Simulate the mechanical system, the electronic system and the data decoding algorithms all in one package.

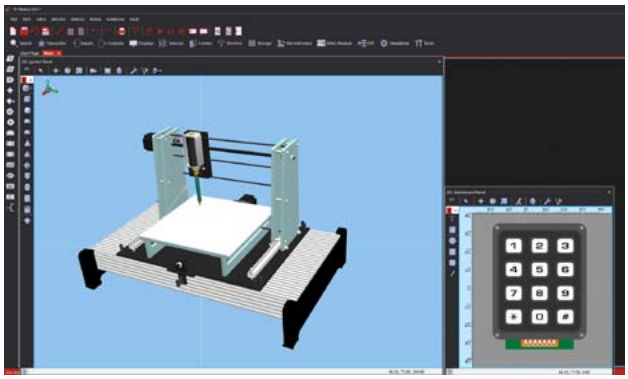


Use Flowcode Dashboard objects to simulate system performance in human friendly graphical format.

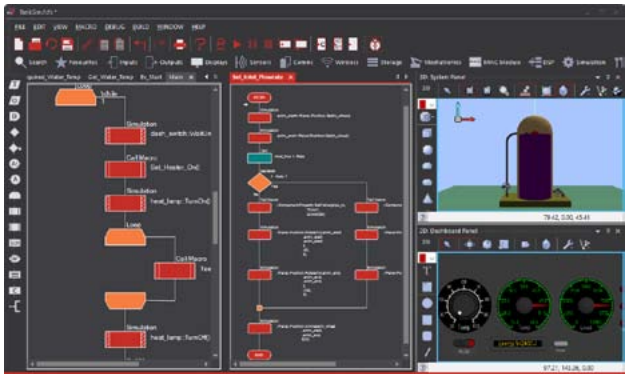
Test



Download to the microcontroller in the E-blocks development system and use In-Circuit-Test and Softscope feature to verify operation at pin level.

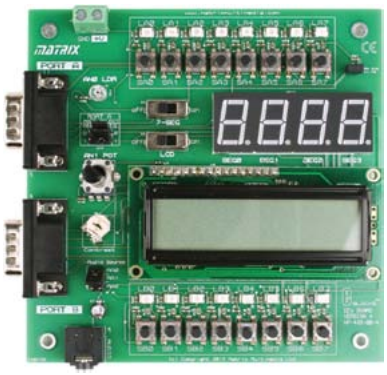


Use In-Circuit-Test to test and debug at a pin level.

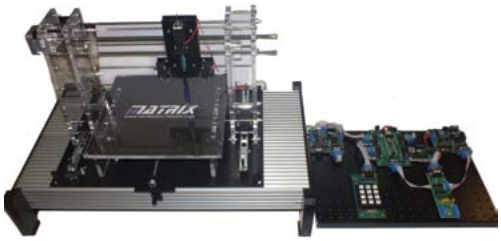


Link Dashboard objects, Softscope and Console to third party instruments using DLLs in SCADA fashion to verify performance in real time.

Deploy



Develop the final circuit board and release to market.



Develop the final product, verify operation and release to market.

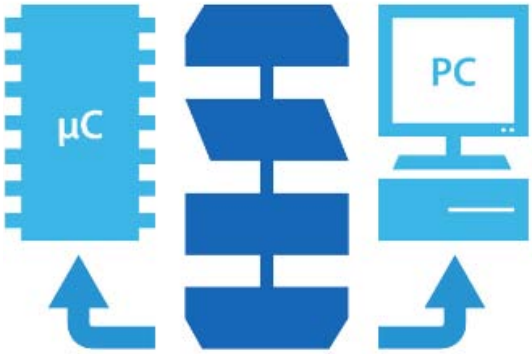
Deploy your system in a control system based on microcontrollers, MIAC controller or Windows PC linked to third party controllers using DLLs.

Advantages of using Flowcode

Flowcode software is based on standard flowchart symbols. Flowchart icons can be compiled to a microcontroller and can be executed on a Windows PC. The PC-side software in Flowcode includes a full suite of Windows commands for mathematics, controlling graphics on the monitor, communications via Ethernet etc. In fact Flowcode includes a full Windows programming language as well as a microcontroller compiler.

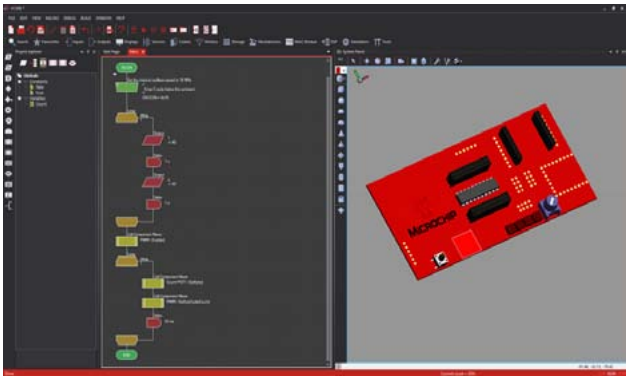
This PC-side and chip-side functionality makes Flowcode really powerful:

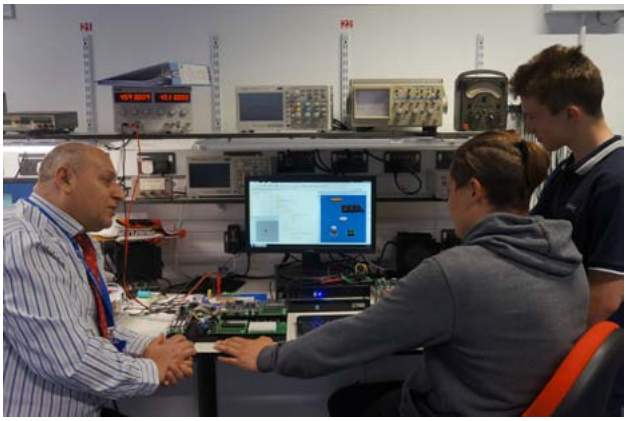
- Complex systems can be designed and simulated before chip-side compilation which saves design time.
- In-Circuit-Test data can be linked to simulations to show system performance at run-time which proves designs function properly.
- Programs can be deployed on a microcontroller or a Windows PC.



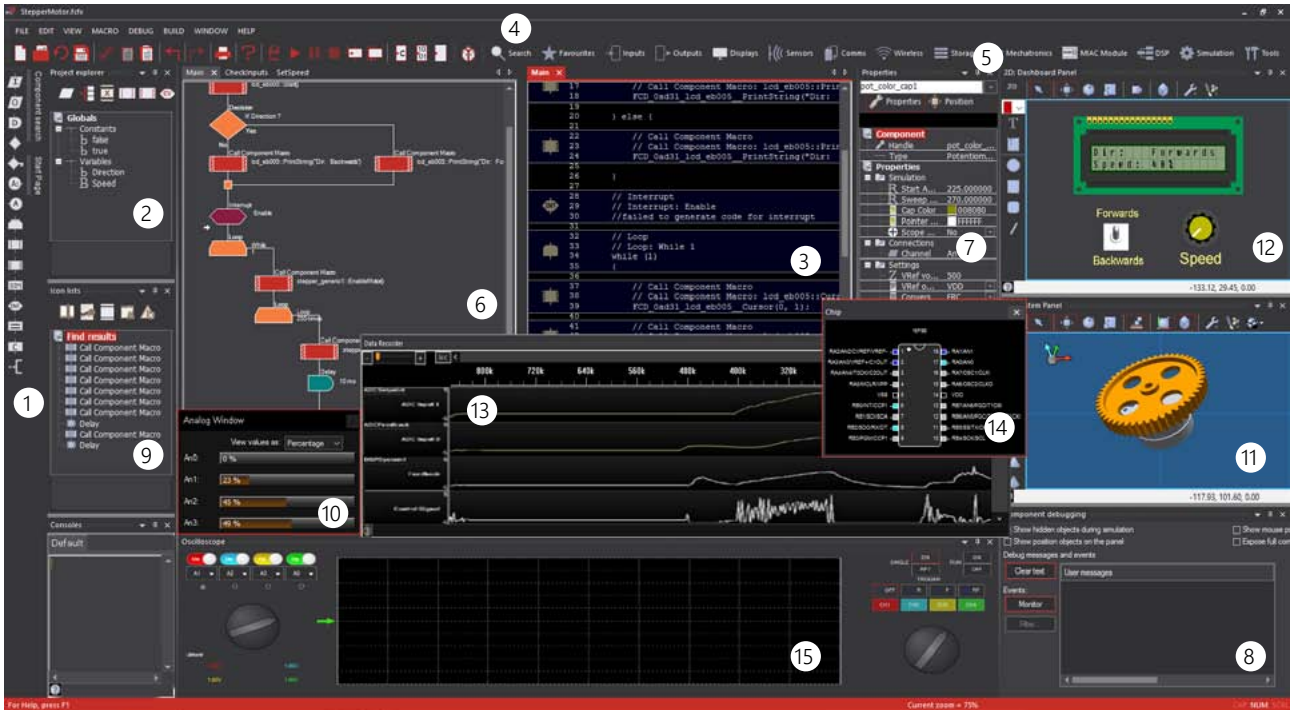
5 reasons for using Flowcode 7:

1. It's easy-to-use: Flowcode's graphical environment makes it a perfect tool for teaching embedded systems or developing complex designs.
2. Advanced test & debugging features: including simulation, code-profiling and Ghost technology allows users to make use of in-circuit-test (ICT) and in-circuit-debug (ICD) features including a built-in oscilloscope and data recorder.
3. Non-programmer friendly: mechanical engineers, test engineers, chemical engineers and just about any other engineer working with microcontrollers can easily develop systems for MCU's.





4. Microcontroller flexible: with support for a host of PIC devices as well as Atmel, Arduino and ARM MCU's, Flowcode gives you a broad range of target devices for your development needs. Code-porting is also easier than ever before.
5. It's FREE: users who do not require commercial or academic rights, additional features or full device support can use the free version of Flowcode 7 for developing applications at home or to prototype designs.



1. **Icon tool bar** - drag and drop standard flowchart icons onto your flowchart. Click to edit properties for a syntax-correct program.
2. **Project explorer** - instantly see all the ports, macros, variables, constants and components in your project.
3. **C code program** - monitor the C code equivalent of your flowchart; as fast, syntax correct code is generated automatically on a per icon basis.
4. **Control tool bar** - use the standard tool bar for editing your program and also for stimulating your program and running In-Circuit-Debug / Test.
5. **Component tool bar** - choose your electromechanical component from our large library of parts; from simple switch to Bluetooth module.
6. **Flowchart program** - drag, drop and edit standard flowchart icons to create a program. Design flowchart macros that can be called from other icons. Use Flowcode's powerful PC-side language to control external instruments, and monitor your systems.
7. **Properties editor** - see and edit the properties of all components.
8. **Component debug** - see the API calls in your program and component design.
9. **Icon list window** - for search results, error messages, breakpoints and bookmarks.
10. **Analogue window** - see the state of the analogue inputs in your design.
11. **System panel** - design your system using the multi-view system panel. Use off-the-shelf electromechanical components or design your own. Import your model from a program like Sketchup or Solidworks.
12. **Dashboard panel** - control and monitor your program in simulation and In-Circuit-Test. Write programs using simulation API commands to show real world equivalents of your data in human-friendly formats.
13. **Data recorder** - use this to show time-varying signals in your system. Link the scope to simulation data or real data during In-Circuit-test.
14. **Chip** - use the chip window to view and control the status of the inputs and outputs on your chip in simulation and In-Circuit-Test.
15. **Oscilloscope** - another important debugging tool that displays important data from your project.

Graphical programming

Simple, flowchart icons

The graphical icons which are used to develop your system within Flowcode are easy-to-use. If you're a first time developer or have little experience of developing electronic systems, Flowcode will make it easy for you to pick up the fundamentals and run with your designs. For version 7, users can also now customise their projects with colour coded sections, to make complex projects easier to navigate.

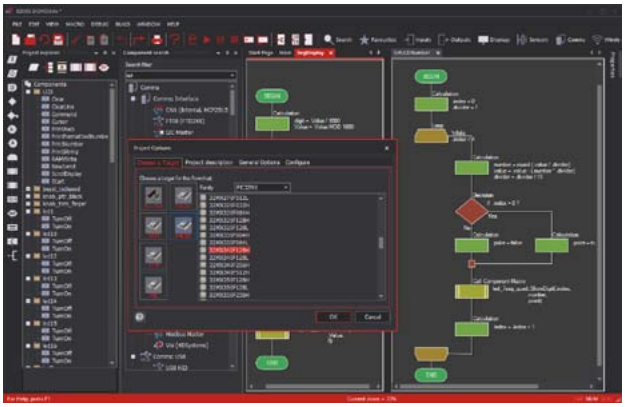
Fast system development

NEW

Programming can be a complex, drawn out process and can often and easily result in errors. Ensuring your code is accurate and precise takes skill and time. With Flowcode, your job becomes easier. Programs that previously took hours to design and perfect can be brought together in minutes.

Learn and program using code

If you're more advanced in your understanding of programming, or have pre-written code you want to embed into your design, Flowcode allows you to do just that. What's more, if you're using graphical icons, you can view and learn code side-by-side with your design, meaning academic users of Flowcode develop their learning over time.

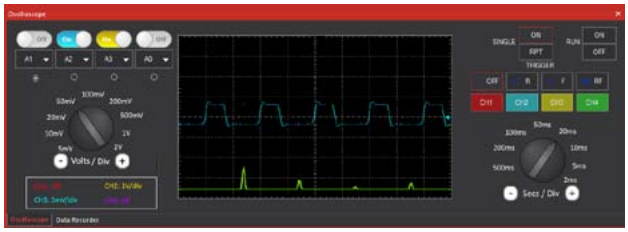


Testing & debugging

Ghost Technology

Ghost Technology is an advanced way of testing and debugging your electronic system. Using Matrix's E-blocks hardware (EB006v9 and EB091, PIC and dsPIC multi-programmer boards), you can monitor every pin on your microcontroller and monitor and interpret serial data inputs and outputs. Flowcode includes an in-software oscilloscope and data recorder which displays feedback and information live from the hardware you're using after compilation.

For more on Ghost technology, see page 11



Simulation debugger

For many engineers, a key requirement is to ensure the designs you have developed will work when you compile to your microcontroller. Flowcode allows you to do all you need in simulation (see page 9) using the simulation debugger which becomes active during simulation and is used to monitor both the values of the variables in your program and the macros which are being called.

Code profiling

NEW

Code profiling is a new feature that will be launched for the first time in Flowcode 7. This feature shows when icons have been 'hit' during a simulation run, highlighting sections of code that may be deemed redundant and other parts which are executed more often and may need optimising to improve program efficiency.

Simulation

Create simple designs

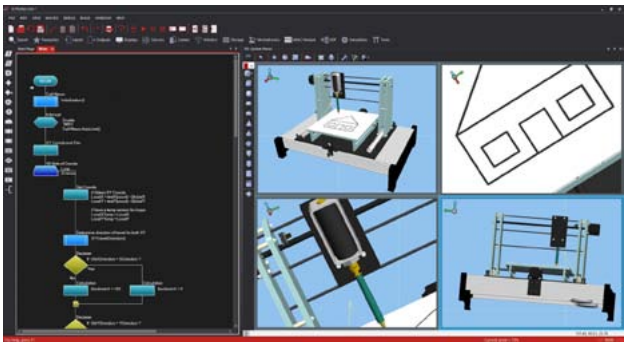
You can use the Flowcode system panel tools to create your own simple 3D models within the software itself. Test the accuracy of your program by creating a simple actuator or valve, or add simple shapes to your existing designs and use the built in API to control these creations during simulation.

Import your designs from CAD packages

Flowcode integration with third party drawing packages through support for various file formats means that you can easily import your 3D drawings and designs into Flowcode and characterise and bring their electromechanical elements to life with the advanced simulation capabilities.

Multi-view system panel

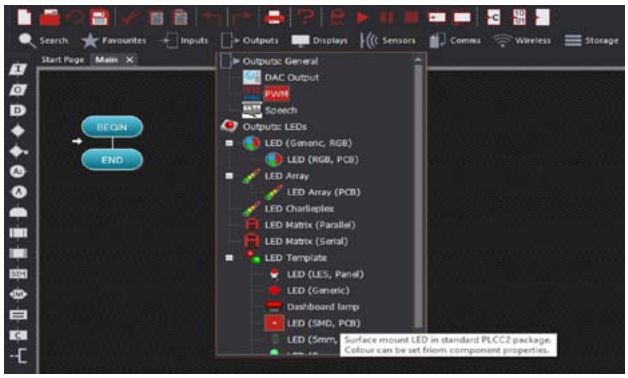
View your designs from different angles whilst simulation is taking place within the system panel. Split-screen capabilities means you can ensure you're happy with your electronic design. What's more, simulation speed means your simulation now works close to real-time - so you can verify your design ´live´.



Component library

Pre-developed components

A whole suite of electromechanical components exist in our large library of parts; from simple switches and LED´s to more complex communications modules. These components are developed and grown with every release of Flowcode we launch to ensure you have what you need to develop your electronic systems.



Communications components

Communications developments form a large part of modern day electronic education and understanding. Communications including CAN bus, Bluetooth, USB, Ethernet and WI-FI are widely studied across the globe. All of these components are available within the Flowcode environment.

NEW v7 components

NEW

Flowcode V7 contains 245 components that can be used to create a wide range of electrical and electromechanical systems. These components can also be used as a basis for creating your own components or simulations.

Supported devices

E-blocks

Use Flowcode to program Matrix´s electronic modules; the perfect platform for learners, engineers and electronic system developers to quickly prototype designs on a rugged platform. A range of programming boards and peripheral downstream boards such as input, output, communications, prototype boards and more make this the ultimate development platform.

MIAC

The MIAC range from Matrix gives electronic engineers a rugged industrial platform on which to develop their designs. With MIACs now available not only with an 8bit PIC MCU but also 16bit PIC, Arduino and Raspberry Pi (not compatible with Flowcode), users have a rugged PLC which is easy to program and perfect for harsh, industrial environments.

Arduino

One of the major benefits of using Flowcode, is that it simplifies the programming of Arduino platforms. AVR support means you can do more with your Arduino than you ever dreamed – you can even integrate it into our E-blocks modules with our E-blocks Arduino Shields.

8bit PIC

Flowcode provides support for the entire performance range of 8-bit microcontrollers from Microchip, with easy-to-use development tools, complete technical documentation and post design in support through a global sales and distribution network.

16bit PIC

Flowcode also supports Microchip's 16bit family of MCU's - also known as dsPIC or PIC24 devices.

32bit PIC

NEW

New for version 7 is Flowcode's ability to support the PIC32 range from Microchip. The PIC32 family delivers 32bit performance and more memory to solve increasing complex embedded system design challenges.

Microchip templates

NEW

Another new feature of Flowcode 7 is the inclusion of templates for a number of popular Microchip development boards including the Curiosity and Xpress boards.

AVR & ARM

Atmel's AVR devices including the popular Arduino, plus a range of ARM MCU's are also supported in Flowcode 7.

For a full list of the supported microcontrollers in Flowcode 7, please see page 18.

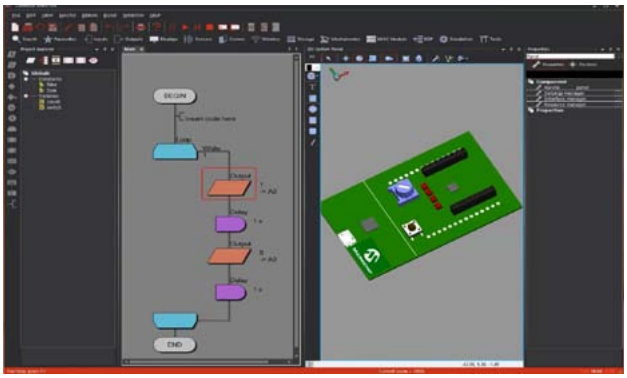
Microchip XC Compilers

NEW

For the first time, Flowcode will include Microchip's XC compilers in version 7. For those familiar with previous versions of Flowcode, this will improve the speed at which 8bit PIC devices compile by more than ten times compared to previous versions of the software.

MPLAB® XC Compilers

MPLAB® XC8	MPLAB XC16	MPLAB XC32
8-bit Architecture	16-bit Architecture	32-bit Architecture



Here, we can see the template set for a Microchip Xpress board being programmed in simulation mode using Flowcode. Users can also them compile to the hardware device easily using USB.

Ghost is a PC-side technology which, when combined with Flow-code, provides a new way of debugging electronic systems.

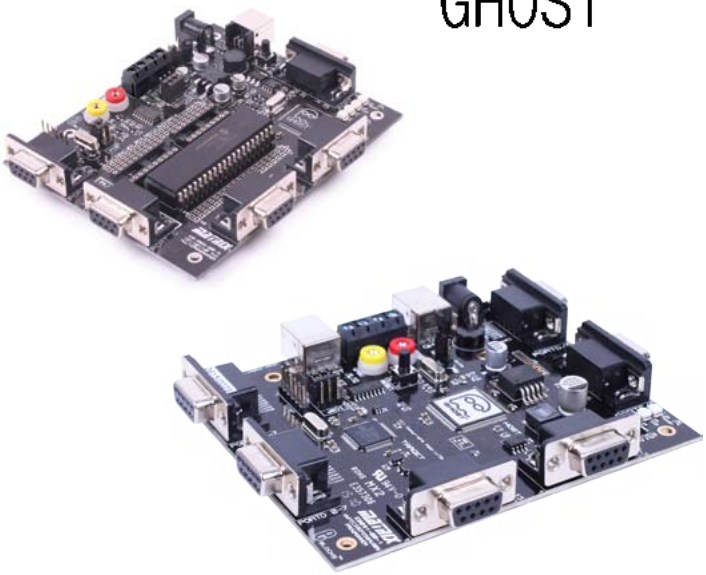
Ghost technology provides a real time log of the status of all the pins on the microcontroller whilst a Flowcode program is running on the device. Ghost data can be viewed on the Flowcode Softscope at the same time as the flow chart simulation. You can run, pause, and step through, your program and view real-time data at the same time and view variables, registers and other memory locations. We call this 'In-Circuit-Test'.

When this data is combined with the PC-side processing capabilities of Flowcode it provides a very powerful debugging and learning tool.

This saves huge amounts of development time - whether you are working at a pin level and getting your first program to work, or whether you are an advanced user wanting to perform a sanity check to make sure communications baud rates are set at the correct speed.

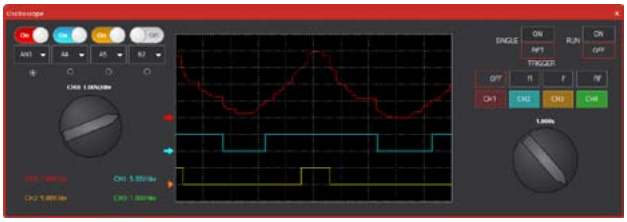
Both analogue and digital data is gathered through Ghost and displayed on the newly developed (for version) Flowcode Oscilloscope or the data recorder. On the data recorder, communications busses decoding overlays for SPI, I2C, and other comms standards are available.

Ghost data can also be passed to simulation/ SCADA components in Flowcode to provide Human Machine Interface style debug features.



Ghost technology is available on a range of Matrix hardware including the 8bit and dsPIC multiprogrammer boards, EB006v9 and EB091 (above), and now with the new FlowKit v2 for Matrix hardware plus your own hardware including Arduino (below).

Below is an example of the new oscilloscope, developed for Flowcode 7. You can also see below how the new feature can be used for test and debug of electronic systems.



Academic support and support for learners

Flowcode delivers outcomes not only in professional, industrial business but also at a number of levels of education. For many years Flowcode has delivered at further and higher education levels.

- In France, hundreds of further and higher education establishments, known as lycee techniques use Flowcode to deliver teaching of electronic system design.
- In Flemish Belgium most technical schools use Flowcode to deliver a combined course in electronics and Mechanics.
- Hundreds of 16-18 Colleges, 20 top Universities and numerous other training institutions in the UK use Flowcode.
- Flowcode is used as an educational product in over 50 countries around the world.

Students can use Flowcode for learning programming, electronic design, robotics, and pneumatics and can link programs to a range of Matrix hardware systems including our low cost Prototype and Projects boards, Formula AllCode robot, our MIAC and Automatics solutions and any third party hardware that accepts hex code for the appropriate microcontroller devices.

What's more, Flowcode also has compatibility with packages including Solidworks and DesignSpark Mechanical meaning users can characterise electronic elements and parts in their mechanical designs.

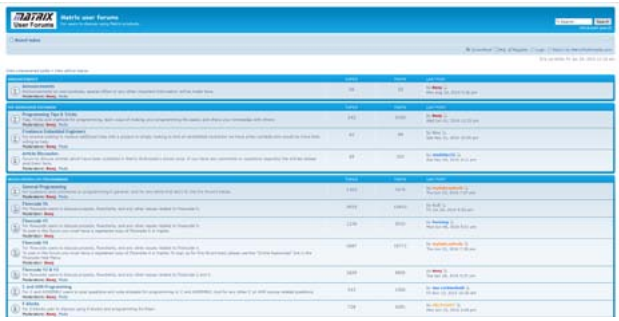
Flowcode is very well supported. Complete beginners will find our free online courses great for covering the basics of developing electronic systems.

Meanwhile, experts will find our examples, manuals and hardware module datasheets online invaluable.

All users will value the support offered by our engineers, valued contributors, and extended online community.

The Flowcode Wiki site provides you with a detailed glossary style overview of the aspects of the Flowcode environment broken down into relevant sections to aid in finding the knowledge you require to use Flowcode effectively.

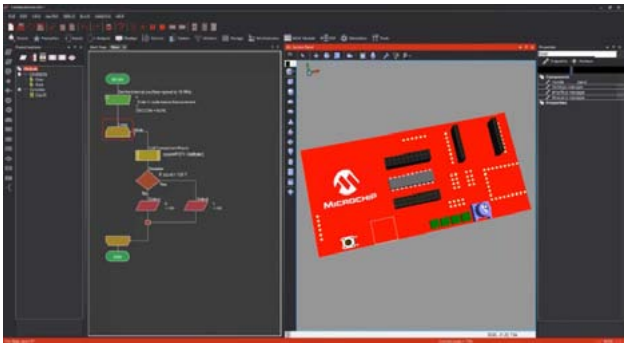
The Matrix forum provides an in-depth community of well established, long-term users of Flowcode and new Flowcode users sharing ideas and solving problems and issues encountered whilst using the software and is attended to and updated by our own engineers.



New for Flowcode 7 is a suite of beginner courses to help those who are new to Flowcode get up and running with their first designs and projects. These can be accessed **here.**

We have a range of free, pre-developed Flowcode programs for you to open in the Flowcode environment itself and browse, use or further develop to your own desire.

Within Flowcode, users also receive a range of pre-developed templates (e.g. right). These can be customised and saved as your own template files too, allowing you to save time and investment with your program development by starting off with one of these files.



Professional engineer support

Whilst the same, superb help facilities exist for professional users of Flowcode, as those that exist for academic users (see page 12), there is also another area of support that we now offer to assist professional engineers with the services they require from additional enhanced customer support with rapid response times, training to ensure you are getting the most out of your Flowcode software, to assistance in your own internal development projects .

Wiki

Forum

Course

Examples

Professional extended services

Whether you need assistance to get you up and running with your first Flowcode project, or need some technical expertise to help speed up more complex developments using Flowcode, our team of engineers are here to help. Priced from £500 (+VAT) per project, to many users of Flowcode this service is a valuable addition to the Flowcode package.

Training

Flowcode training is offered three times per calendar year at Matrix HQ in Halifax, West Yorkshire. Alternatively, we offer all Flowcode users on-site Flowcode training, which can be delivered at your place of work/study from £800 + VAT per day + travel and expenses. We can tailor training at your site to your specified needs, or deliver our pre-defined courses.

Whilst these options already exist, plans are also afoot for us to offer a range of downloadable Flowcode 7 training courses online where users can register for a small fee and access a wealth of training material.

Enterprise licenses

Whilst the Flowcode licencing structure is defined in more detail on pages 14 and 15, it's important to understand that version 7 features multiple user professional licences for the first time.
An enterprise licence is activated when a user selects more than a 1 user licence of Flowcode.
When a user purchases a 5 seat licence of Flowcode, with all chip variants included, you receive £500 of professional services for your team – for example, this could be attendance at our Introduction / Advanced training courses at Matrix HQ.

For more information on professional services, **click here** or contact Matrix TSL on +44 (0) 1422 252 380.

Flowcode 7 licensing is modular and straightforward, meaning you can now get the Flowcode licence that works for you, without the requirement to get every available feature. Below, we outline how licencing works for Flowcode 7. You can follow further instructions on how to acquire a Flowcode licence at **our website.**

Flowcode 7 also includes a completely free version. The free version of Flowcode is designed to give home users and those wanting an evaluation version of the software, access to a feature limited version of Flowcode 7. The free version is not licenced for commercial or educational institution use.

Please note, licensing may differ when purchasing through one of our official distributors. For more specific information on how licensing works with your local distributor, please contact them via the details available on the 'contact' pages of the **Matrix website.**

User type

The first step is for you to outline the 'type of user' you are. Users can be defined by either 'standard', which is suited to engineers who are home-users of Flowcode. Secondly, professional users are those who are looking to use Flowcode in a commercial environment. Academic users should **contact us** for discounted single and multi-user Flowcode licences.

Standard

A 'standard' user of Flowcode is someone who wishes to develop applications at home. A standard user licence does not give the user commercial rights; commercial rights can only be achieved by purchasing a professional Flowcode licence.

Professional

A 'professional' Flowcode user is someone who is using Flowcode code in commercial products or is working in a commercial environment. These type of users must select a professional licence.

Academic

Academic licences are available to Schools/Colleges/Teachers and Students. Available in 1, 10 and 50 user versions with large discounts. Academic pricing can only be found by contacting Matrix, or your local distributor direct. All academic licences are perpetual, meaning users do not have to pay an annual fee for their licence.

Device selection

Next, users must select the 'devices' they wish to be supported in their Flowcode licence. Of course, the free version of Flowcode will give a handful of target devices to the user without a charge, but this section gives the user the ability to select a vast range of supported devices, from your favourite microcontroller family.

8 bit PIC

16 bit PIC

32 bit PIC

AVR /Arduino

ARM

Users

If you are a professional or academic user, you can secure a number of multiple user licence options with your Flowcode licence. For professional users, you can select 2 or 5 licences at a discount price. Academic users can select from 10 or even 50 user site licences, again at a discounted price. For more information, **contact us.**

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Features

Next, users select the features that they wish their Flowcode licence to include. The feature packs below are all optional with standard and professional Flowcode licences, but are supplied as standard with the academic version of Flowcode.

Comms pack A

Contains a number of components for common chip-to-chip communications protocols. These include: I2C, MIDI, One Wire, RS232, SPI, UART, CAN, DALI, DMX_512, LIN, Modbus Master.

Comms pack B

Contains components to perform wireless, USB and web-based communications. These include: TCP/IP, USB HID, USB MIDI, USB Serial, USB Slave, Webserver, Bluetooth, WLAN, GSM, GPS, RfID, Zigbee.

Ghost facilities

Unlocking this pack will give the developer access to the debugging features of Flowcode such as Code Profiling and Ghost technology (In Circuit Debug and In Circuit Test), including the Data Recorder and Oscilloscope features.

DSP pack

Gives access to the Flowcode DSP components, including Control, Delay, DSP System, Fast Fourier Transform {FFT}, Filter, Frequency Generator, Input, Level, Output, Scale, Sum.

Simulation pack

These educational simulations have been built by our own engineers and model real world systems, such as an adjustable car seat, conveyor belt and aircraft landing gear.

Mechatronics pack

This pack contains a range of motors and other electromechanical devices within Flowcode, including 3D Printer, G Code Parser, Motor {Full Bridge}, Motor {Half Bridge}, Photo Reflector, Photo Transistor, Servo Controller, Servo Base, Solenoid Base, Solenoid DC1, Servo, Stepper Generic, Stepper Base.

Misc pack A

Gives access to a variety of other useful Flowcode components which include Injector {File}, K8055D, Picoscope, TTI Power Supply, TTI TG5011, Accelerometer Gyro {MPU_6050}, Circular Buffer, EEPROM, FAT, Lookup tables, Speech, String Translator.

Display pack

Allows developers to use Display components for a wide range of graphical and alpha-numeric LCDs. These include: GLCD - EB043, EB057, EB075, ILI9341, KS0108, SSD1289, SSD1305, SSD1306, SSD1322, SSD1351, ST7036, ST765R, ST7567, T6963C. Also LCD – AdafruitOLED, Generic 20x4, Generic, I2C, 4x20 AdafruitOLED.

Input / output pack

Gives access to a range of input and output {I/O} devices. These include Potentiometer, Rotary Encoder, Thermistor base, 7Segment{Quad}, Dashboard lamp, Keypad, LED {various}, LED Array, LED Matrix, Microswitch, PWM, Switch {various}, Touch pads.

For more information on what's included in each feature pack, **click here**.

Upgrades

Users of Flowcode 5 and Flowcode 6 will receive handsome upgrade discounts to Flowcode 7. If you're a Matrix customer, you can purchase direct from us by putting your version 5 or 6 licence key into the Flowcode purchasing pages on our website.

Alternatively, you can purchase Flowcode upgrades with the discount applied from your local distributor.

ACTIVATION

Each product will need activation with a code issued by Matrix. An internet connection is required for this.

UPGRADE RIGHTS

Upgrade rights do not apply to all versions of Flowcode. If your version of Flowcode has been included free of charge with MIAC or other hardware systems then upgrade rights might not apply.

Flowcode 7 components

- Control
- DSP System
- Delay
- Fast Fourier Transform (FFT)
- Filter
- Frequency Generator
- Input
- Level
- Output
- Scale
- Sum
- MIAC (Arduino-Compatible)
- MIAC (PIC)
- MIAC (dsPIC)
- MIAC: Addon Modules
  - MIAC (PIC) CAN Slave
  - MIAC Advanced
  - MIAC Basic
  - MIAC Bluetooth
  - MIAC GPS
  - MIAC GSM
  - MIAC Industrial
  - MIAC Serial
  - MIAC Zigbee Coordinator
  - MIAC Zigbee Router
- MIAC: PC Peripheral
  - MIAC (PIC) USB Slave
- 2D Shapes
  - Ellipse
  - Label
  - Line
  - Rectangle
  - Rounded rectangle
  - Textbox
- 3D Shapes
  - Bowl
  - Cone
  - Cuboid
  - Cylinder
  - Diamond
  - Hemisphere
  - Honeycomb
  - Prism
  - Pyramid
  - Sphere
  - Tube

- 3D Printer
  - G Code Parser
- Animator
- Controls
  - Dashboard Text
  - Scale Arc Template
    - Dashboard Meter
    - Dashboard Knob
  - Scale Linear Template
    - Dash Scale Vertical
    - Dash Scale Horizontal
  - Simulation Switch Template
    - Simulation Slide Switch
    - Simulation Push Switch
  - Slider control
- Motion Helper
- Panel Console Viewer
- Simulation LED
- 3rd Party Equipment/Tools
  - K8055D
  - PicoScope (PS2000)
  - TTI TG5011 Signal Generator
  - TTi Power Supply - PL155-P
- Matrix Tools
  - Auto Version Identifier
  - Device Helper
  - E-block Helper
  - IntOsc Helper
  - Scope monitor
- Modelling Components
  - Clone Matrix
  - Formula Flowcode Racetrack
  - Maze Generator (HP458)
  - Target Chip
- Inputs: Analog
  - ADC Template
    - Potentiometer (Panel)
    - Potentiometer (Trimmer)
    - Potentiometer (Black)
    - Potentiometer (Slider)
    - Potentiometer (Colour)
- Inputs: General
  - Encoder Rotary
  - Touch Pads (EB088)
- Inputs: Keypads
  - Keypad (Generic)
    - Keypad (Hex 4x4)
    - Keypad (EB014 3x4)
    - Keypad (Cursor 3x3)
- Inputs: Switches
  - Switch Array Template
    - Switch Array (Push)
    - Switch Array (Slide)
  - Switch Template
    - Switch (Push, PCB)
    - Switch (Rocker)
    - Switch (Slide, Dashboard)
    - Switch (Push, Panel)
    - Switch (Toggle, PCB)
    - Switch (Slide, PCB)
    - Switch (Generic)
    - Switch (Toggle, Panel)
    - Switch (Push, Dashboard)
    - Switch (Push, PCB, SMT)

- Displays: Alphanumeric
  - LCD (Adafruit, OLED)
  - LCD (Generic)
    - LCD (Generic, 20x4)
    - Combo Board (EB083)
    - LCD (EB005, 16x2)
    - LCD (I2C)
- Displays: Graphical
  - Bitmap Drawer
  - GLCD base
    - GLCD (SSD1322) Buffered
    - GLCD (SSD1322) Parallel
    - GLCD (EB076, 4D-Picaso)
    - GLCD (EB043-00-1)
    - GLCD (SSD1306) Buffered
    - GLCD (EB076v2, 4D-Picaso)
    - GLCD (EB075, 4D-Goldelox)
    - GLCD (EB043-00-2)
    - GLCD (ST7036) I2C
    - GLCD (SSD1305)
    - GLCD (SSD1305) Buffered
    - GLCD (SSD1306)
    - GLCD (ILI9341)
    - GLCD (SSD1289)
    - GLCD (EBM001)
    - GLCD (EB057)
    - GLCD (ST7565R) Parallel
    - GLCD (SSD1351)
    - GLCD (SSD1306) I2C
    - GLCD (T6963C)
    - GLCD (ST7567) SPI
    - GLCD (KS0108)
- Displays: Segment
  - 7Segment (Quad)
  - 7Segment (Single)
  - Starburst Display
- Outputs: General
  - DAC Output
  - PWM
  - Speech
- Outputs: LEDs
  - LED (Generic, RGB)
    - LED (RGB, PCB)
  - LED Array
    - LED Array (PCB)
  - LED Charlieplex
  - LED Matrix (Parallel)
  - LED Matrix (Serial)
  - LED Template
    - LED (LES, Panel)
    - LED (Generic)
    - Dashboard lamp
    - LED (SMD, PCB)
    - LED (5mm, PCB)
    - LED (5mm, Panel)
- Circular Buffer
- EEPROM
- Embed File
- FAT (SD, SDHC)
- Lookup tables
- Serial EEPROM (24C32)
- String Translator

- Accelerometer (EB068, LIS3LV02DQ)
- Collision Detector Template
  - Microswitch
  - Beam Breaker
- Photo Reflector
- Photo Transistor
- Proximity Switch Template
  - Reed Switch
- Sensors: EBM Modules
  - Colour Sensor (TCS3200, EBM018)
  - Digital Temperature (LM75B, EBM004)
  - Dual Potentiometer - Trimmer (EBM006)
  - Gyroscope (L3G4200D, EBM009)
  - Hall Effect (SL353, EBM011)
  - Humidity (SHT21, EBM016)
  - Infrared (EBM020)
  - Magnetometer (LSM303DLHC, EBM015)
  - PIR (EBM012)
  - Potentiometer (EBM002)
  - Rotary Encoder (EBM007)
  - Thermocouple TypeK (EBM008)
  - Touch Pads (EBM013)
  - Touch Slider (EBM014)
  - Ultrasonic (EBM019)
- Thermistor Template
  - Thermistor (EBM003)
- Comms: Interface
  - CAN (Internal, MCP2515)
  - FTDI (FTD2XX)
  - I2C Master
  - I2C Slave
  - One Wire
  - RS232
  - SPI Master
- Comms: Networking
  - Base 64
  - TCP Template
    - TCP/IP (NM7010A)
    - TCP/IP (WIZ810MJ)
  - TCP/IP (ENC28J60)
  - Webserver (NM7010A)
  - Webserver (WIZ810MJ)
- Comms: System
  - DALI Master
  - DALI Slave
  - DMX-512 Master
  - DMX-512 Slave
  - MIDI
  - Modbus Master
  - Modbus Slave
  - Visi (4DSystems)
- Comms: USB
  - USB HID
  - USB MIDI
  - USB Serial
  - USB Slave
- Data Injector Template
  - Injector (GPS NMEA)
  - Injector (AT)
  - Injector (DS1307 RTC)
  - Injector (Human Interface)
  - Injector (File)
  - Injector (COM)
  - Injector (Flowcode vNet)
  - Injector (CAN)
  - Injector (Loopback)

- Formula AllCode (RB4420)
- Formula AllCode API
- Formula Flowcode
- Motor Template
  - Motor (Full Bridge)
  - Motor (Half Bridge)
- Servo Controller
- Servo Motor Template
  - Micro Servo (Tower Pro 9g)
  - Standard Servo
- Solenoid Template
  - Solenoid DC1
- Stepper Motor Template
  - Stepper (NEMA8)
  - Stepper - Generic

You can also find more information on Flowcode components by **clicking here**

PIC 8

10F200, 10F202, 10F204, 10F206, 10F220, 10F222, 10F320, 10F322, 10LF320, 10LF322, 12C508, 12C508A, 12C509, 12C509A, 12C671, 12C672, 12CE518, 12CE519, 12CE673, 12CE674, 12F1571, 12F1572, 12F1612, 12F1822, 12F1840, 12F508, 12F509, 12F510, 12F609, 12F615, 12F617, 12F629, 12F635, 12F675, 12F683, 12HV609, 12HV615, 12LF1571, 12LF1572, 12LF1612, 12LF1822, 12LF1840, 16C716, 16C717, 16C72, 16C72A, 16C73, 16C73A, 16C73B, 16C74, 16C74A, 16C74B, 16C76, 16C77, 16C770, 16C771, 16C773, 16C774, 16C84, 16C923, 16C924, 16CR72, 16CR83, 16CR84, 16F1454, 16F1455, 16F1459, 16F1503, 16F1507, 16F1508, 16F1509, 16F1613, 16F1614, 16F1615, 16F1618, 16F1619, 16F1764, 16F1765, 16F1768, 16F1769, 16F1784, 16F1786, 16F1787, 16F1788, 16F1789, 16F1823, 16F1824, 16F1825, 16F1826, 16F1827, 16F1828, 16F1829, 16F18313, 16F18323, 16F18324, 16F18325, 16F18344, 16F18345, 16F1847, 16F18854, 16F18855, 16F18856, 16F18857, 16F18875, 16F18876, 16F18877, 16F1933, 16F1934, 16F1936, 16F1937, 16F1938, 16F1939, 16F1946, 16F1947, 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PIC 16

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PIC32

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AVR

Arduino BT 168, Arduino BT 328, Arduino Duemilanove 168, Arduino Duemilanove 328P, Arduino Duemilanove168P, Arduino Ethernet, Arduino EtherTen, Arduino Fio, Arduino Leonardo, Arduino LilyPad 168, Arduino LilyPad 328, Arduino LilyPad Simple and Simple Snap, Arduino LilyPad Usb, Arduino Mega 1280, Arduino Mega 2560 R3, Arduino Mega 2560, Arduino Mega ADK 2560 R3, Arduino Mega ADK 2560, Arduino Micro, Arduino Mini, Arduino Nano 168, Arduino Nano 328, Arduino Pro 168 3V3, Arduino Pro 168 5V, Arduino Pro 328 3V3, Arduino Pro 328 5V, Arduino Pro Mini 3V3, Arduino Pro Mini 5V, Arduino RFu-328, Arduino Trinket, Arduino Uno PDIP, Arduino Uno R3 PDIP, Arduino Uno R3 SMD, Arduino Uno SMD, Arduino XinoRF, Arduino Yun, AT90CAN128, AT90CAN32, AT90CAN64, AT90PWM1, AT90PWM2, AT90PWM216, AT90PWM2B, AT90PWM3, AT90PWM316, AT90PWM3B, AT90PWM81, AT90S2313, AT90S2323, AT90S2333, AT90S2343, AT90S4414, AT90S4433, AT90S4434, AT90S8515, AT90S8535, AT90USB1286, AT90USB1287, AT90USB162, AT90USB646, AT90USB647, AT90USB82, ATMEGA103, ATMEGA128, ATMEGA1280, ATMEGA1281, ATMEGA1284P, ATMEGA16, ATMEGA161, ATMEGA162, ATMEGA163, ATMEGA164A, ATMEGA164P, ATMEGA165, ATMEGA165P, ATMEGA168, ATMEGA168P, ATMEGA169, ATMEGA169P, ATMEGA16A, ATMEGA16M1, ATMEGA16U2, ATMEGA16U4, ATMEGA2560, ATMEGA2561, ATMEGA32, ATMEGA323, ATMEGA324A, ATMEGA324P, ATMEGA325, ATMEGA3250, ATMEGA3250P, ATMEGA325P, ATMEGA328, ATMEGA328P, ATMEGA328PTQFP, ATMEGA328TQFP, ATMEGA329, ATMEGA3290, ATMEGA3290P, ATMEGA329P, ATMEGA32C1, ATMEGA32M1, ATMEGA32U2, ATMEGA32U4, ATMEGA32U6, ATMEGA406, ATMEGA48, ATMEGA48P, ATMEGA64, ATMEGA640, ATMEGA644, ATMEGA644P, ATMEGA645, ATMEGA6450, ATMEGA6450P, ATMEGA645P, ATMEGA649, ATMEGA6490, ATMEGA6490P, ATMEGA649P, ATMEGA64C1, ATMEGA64M1, ATMEGA8, ATMEGA8515, ATMEGA8535, ATMEGA88, ATMEGA88P, ATMEGA8U2, ATTINY13, ATTINY167, ATTINY22, ATTINY2313, ATTINY24, ATTINY25, ATTINY26, ATTINY261, ATTINY4313, ATTINY44, ATTINY45, ATTINY461, ATTINY48, ATTINY84, ATTINY85, ATTINY861, ATTINY87, ATTINY88, ATXMEGA128A1, ATXMEGA128A3, ATXMEGA128D3, ATXMEGA16A4, ATXMEGA16D4, ATXMEGA192A3, ATXMEGA192D3, ATXMEGA256A3, ATXMEGA256A3B, ATXMEGA256D3, ATXMEGA32A4, ATXMEGA32D4, ATXMEGA64A1, ATXMEGA64A3, ATXMEGA64D3, MIAC (Arduino-Compatible) System, MIAC (Arduino-Compatible)

ARM

AT91SAM7S128, AT91SAM7S128_64, AT91SAM7S16, AT91SAM7S161, AT91SAM7S16_64, AT91SAM7S256, AT91SAM7S256_64, AT91SAM7S32, AT91SAM7S321, AT91SAM7S321_64, AT91SAM7S32_64, AT91SAM7S512, AT91SAM7S512_64, AT91SAM7S64, AT91SAM7S64_64, AT91SAM7S64_EK, AT91SAM7SE256, AT91SAM7SE32, AT91SAM7SE512, EB031, ECIOARM, 32F0308 Discovery, 32F030C6, 32F030C8, 32F030CC, 32F030F4, 32F030K6, 32F030 Nucleo 64, 32F030R8, 32F030RC, 32F031K6, 32F031 Nucleo 32, 32F042K6, 32F042 Nucleo 32, 32F051C8, 32F051 Discovery, 32F051K8, 32F051R8, 32F070 Nucleo 64, 32F072 Discovery, 32F072 Nucleo 64, 32F091 Nucleo 64, 32F302 Nucleo 64, 32F303K6, 32F303 Nucleo 144, 32F303 Nucleo 32, 32F303 Nucleo 64, 32F303RD, 32F303RE, 32F303VC, 32F303VD, 32F303VE, 32F303ZE, 32F303ZD, 32F334K8, 32F334 Nucleo 64, 32F3 Discovery, 32F401 Nucleo 64, 32F405IE, 32F405IG, 32F405RE, 32F405RG, 32F405VE, 32F405VG, 32F405ZE, 32F405ZG, 32F407IE, 32F407IG, 32F407RE, 32F407RG, 32F407VE, 32F407VG, 32F407ZE, 32F407ZG, 32F410 Nucleo 64, 32F411CC, 32F411CE, 32F411E Discovery, 32F411 Nucleo 64, 32F411RC, 32F411RE, 32F411VC, 32F411VE, 32F429 Discovery, 32F446 Nucleo 144, 32F446 Nucleo 64, 32F446ZE, 32F469 Discovery, 32F746 Discovery, 32F746 Nucleo 144

Version control

Version	Author	Date	Changes
1.0	Matrix	28/06/2016	Document creation
1.1	Matrix	12/07/2016	New page addition - pg. 11, image updates
1.2	Matrix	8/03/2017	Updated ARM compatible devices list - pg. 19

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