Operator Panels
Human Machine Interfaces

SmartPanels

Five models in four sizes of 4.3", 7", 10.4" & 15"

Very high resolution in 65535 colors

WinCE 6.0 operation system

Ethernet, USB host, USB client, 2 Serial ports & SD slot

PROFIBUS, PROFINET, DeviceNet, EtherNet/IP

CANopen, EtherCAT, CC-Link, Bluetooth

Video input, Audio input/output, 128 MB Flash

Metal enclosures for Rugged environments

IP66K Stainless Steel front for food, beverage, pharma

Vertical or horizontal display

LED backlight for long lifetime

USB Host for Printer, Keyboard, Flash drive and Mouse

Low power consumption and fanless HMI's

Optional AC power

Last Updated: July 01, 2009

Panel Studio

Many PLC drivers supported

Recipe management, Multilingual

Script programming supported

Data acquisition complied with FDA 21 CFR part 11

Reports, Web Server & Alarm management

Real-time trends, bar graphs & historical trends

Lots fine made components, optional Symbol factory

Data exchange with different PLC's simultaneously

Free, Powerful and user-friendly editing software

Online and Offline Simulation

Special tools for Hitorical data archive in PC

Functional buttons for quick application development

Historical Viewer **to see stored data on PC**

BrainChild

SmartPanels Specifications

Model	HMI 450	HMI 730	HMI 750	HMI 1050	HMI 1550
Display					
Size	4.3"	7"	7"	10.4"	15"
Resolution (W X H)	480 x 272	800 x 480	800 x 480	1024 x 768	1024 x 768
Disply type	TFT, Wide Screen	TFT, Wide Screen	TFT, Wide Screen	TFT	TFT
Colors	65,536	65,536	65,536	65,536	65,536
Touch screen Type	Resistive analog touch screen	Resistive analog touch screen	Resistive analog touch screen	Resistive analog touch screen	Resistive analog touch screen
MTBF back light at 25 ^{0}C	30,000 hrs	50,000 hrs	50,000 hrs	50,000 hrs	50,000 hrs
Active display area (W X H mm)					
Backlight	LED	LED	LED	LED	CCFL
Brightness Adjustment via Touch panel	●	●	●	●	●
Brightness, cd/m^2					
Contrast Ratio					
Screen Saver	●	●	●	●	●
Language Fonts	●	●	●	●	●
A Pen for easy Touch screen Operation (Stylus pen)	●	●	●	●	●
Hardware					
Processor, CPU speed	ARM 9, 400Mhz	ARM 9, 400Mhz	ARM 9, 400Mhz	ARM 11, 800MHz	ARM 11, 800 MHz
Flash Memory	64 MB	64 MB	128 MB	128 MB	128 MB
Lithium Memory	●	●	●	●	●
Real Time Clock	●	●	●	●	●
Buzzer	●	●	●	●	●
Video Input	N.A	N.A	Option	Option	Option
Sound Input/Output	N.A	N.A	Option	Option	Option
SD card slot	●	N.A	●	●	●
Communication ports/Interfaces					
RS232C, DB9 Male	1	1	1	1	1
RS232C/ RS422/ RS485, DB25 Female	1	1	1	1	1
Ethernet 10/100 Mbps, RJ45	1	1	1	1	2
USB Host	1, USB 1.1	1, USB 1.1	1, USB 1.1	1, USB 1.1	1, USB 1.1
USB Client	1, USB 2.0	1, USB 2.0	1, USB 2.0	1, USB 2.0	1, USB 2.0
PROFIBUS, PROFINET	Option	N.A	Option	Option	Option
DeviceNet, EtherNet/IP	Option	N.A	Option	Option	Option
CANopen, EtherCAT	Option	N.A	Option	Option	Option
CC-Link, Bluetooth	Option	N.A	Option	Option	Option
Electrical					
Rated Voltage	24 V DC	24 V DC, 110/220V AC	24 V DC, 110/220V AC	24 V DC, 110/220V AC	24 V DC, 110/220V AC
Rated Voltage Range	12-30V DC	12-30V DC, 90-250V AC	12-30V DC, 90-250V AC	12-30V DC, 90-250V AC	12-30V DC, 90-250V AC
Rated Current					
Power Consumption					
Power on LED	●	●	●	●	●
Mechanical					
Size (W X H X D mm)	160 X 130 X 52	222 X 162 X 52	222 X 162 X 52	335 X 263	400 X 310
Panel cut (W X H mm)	123^{+1} X 99^{+1}	197^{+1} X 141^{+1}	197^{+1} X 141^{+1}	310^{+1} X 248^{+1}	367^{+1} X 289^{+1}
Front enclosure	Plastic, IP65	Plastic, IP65	Aluminum alloy, IP65	Aluminum alloy, IP65	Aluminum alloy, IP65
Stainless Steel front enclosure	N.A	N.A	Option, IP66K	Option, IP66K	Option, IP66K
Installation	Panel Mount	Panel Mount	Panel Mount	Panel Mount	Panel Mount
Net Weight					
Protection	IP 65 front, IP20 rear	IP 65 front, IP20 rear	IP 65 front, IP20 rear, S.S. front: IP66K	IP 65 front, IP20 rear, S.S. front: IP66K	IP 65 front, IP20 rear, S.S. front: IP66K

● Available

Environmental

Operating temperature: 0 ^{O}C to 50 ^{O} C

Storage temperature : -20 ^{O}C to 60 ^{O} C

Humidity : 20 % to 80 % RH

Vibration resistance: 9 to 150 Hz, 9.8 m/s^2, X,Y & Z directions 10 times (100 min.)

Operating Shock resistance : 15g at 11 msec

Altitude : 2000 m

Safety : UL 61010C - 1

CSA C22.2 No. 24-93

EN 61010-1 (IEC 1010-1)

EMC : EN61326

Panel Studio Features

Panel Studio is free editing software for Brainchild **SmartPanels**. **Panel Studio** editing software is powerful, user friendly and it has lot of ready made fine components, application development tools, editing tools and animation features.

Panel Studio Plus offers Symbol Factory with with thousands of symbols for many industrial applications
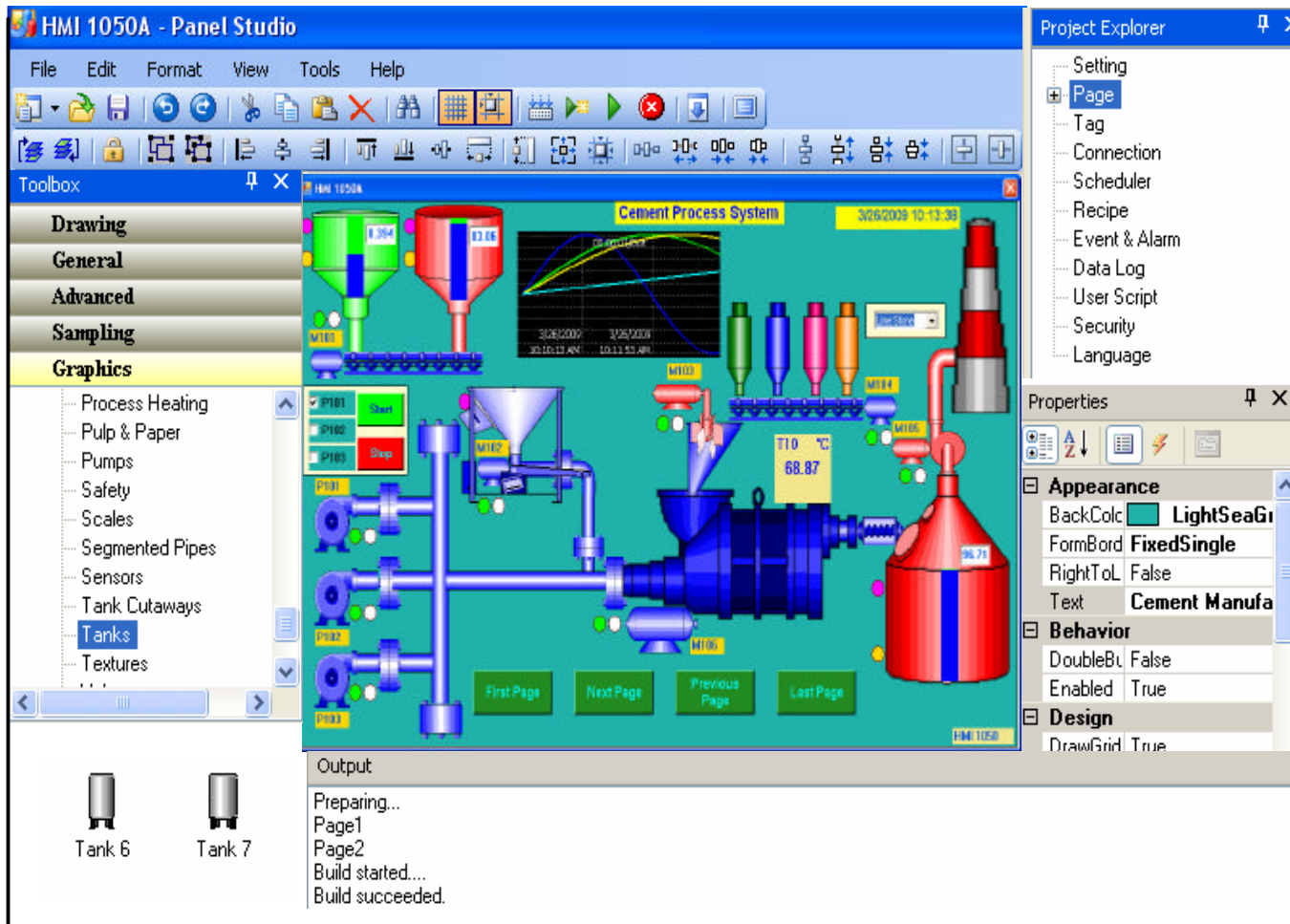
Real/Historical Alarms are possible, 7 type of Alarms available for Configuration

Data Logger is Available, 4 data log methods, 2 log trigger types and 10 data log rates are possible

Data Logging to Internal memory & USB flash memory is possible

PC tools for data archive via Historical viewer. All data stored in USB flash can be archived in PC

Search Historical data with respect to Time, Time period and export to CSV files

Real Time and Historical Trends. Max. 24 pens/trend object

Security management , 100 users with 10 levels to meet FDA CFR part11 compliance

Multi language support is Available. Supports Unicode including south eastern languages

Resusable templates. Any pages can be saved and reuse in other projects

Extensive PLC drivers (Serial & Ethernet) for communcating with wide range of PLC's on various protocols

Multiple drivers at 2 serial COM ports and Ethernet is possible simultaneously

Multiple scan rate for PLC tags, Possible to scan a tag always or on active page mode

Generation of Reports in meaningful and useful for supervisors and operators

Data exchange between two different PLC's, HMI for gateway applications

Data exchange between two HMI's via Modbus, Master/Slave applications

Webserver to view HMI screens via browser via Internet

Application program transfer by Ethernet, Serial Ports and USB flash memory

Symbol factory with hundreds of high rosolution symbols for many industries

Vector Graphics capability and multi layer transperancy. Other formats include bmp, wmf, jpg, gif & png

Support Multiple sessions to open different projects at time time in PC

Support True windows fonts, size, styles for using with Text displays

Edit source code via C# in .Net environment

Integrated Ethernet port for Program download and also connecting to devices via different Ethernet protocols

WinCE offers real time capability and reliable platform for high performance control solutions

Powerful editing software with User friendly tools for application development

Project explorer to quickly view hierarchy of all objects in screen editor

Project compiler to verify the application development (build) before downloading to HMI

Advanced components for quick application development

Special Functional Buttons for Page navigation, Alarm, trend and Data log controls

Scheduler for triggering actions at various time interval and clock settings

Recipe management for Batch process

Script/Macro programming to write expressions for performing Mathematical and Logical calculations

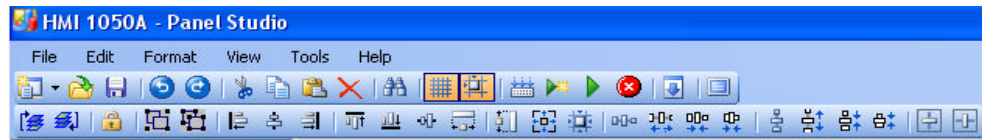Online/Offline Simulation to test developed projects quickly by simulating them in PC

Dynamic objects with Animation capabilities for understanding process conditions quickly for operators

Internal Variables are available and useful in Mathematical calculations

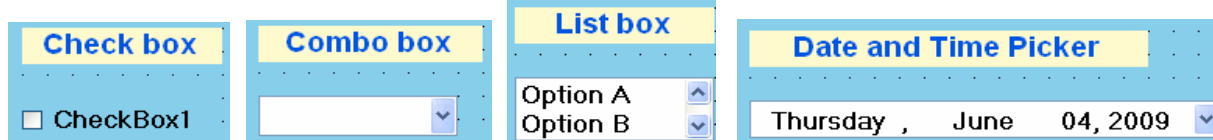Alarm Management- Max. 9 groups are available

Panel Studio Features

Menu Bar

General Tools

Label, Text box, Button, Language Selector, Picture Box, CheckBox, Combo box, List Box, Data/Time picker, Numerical Up/Down
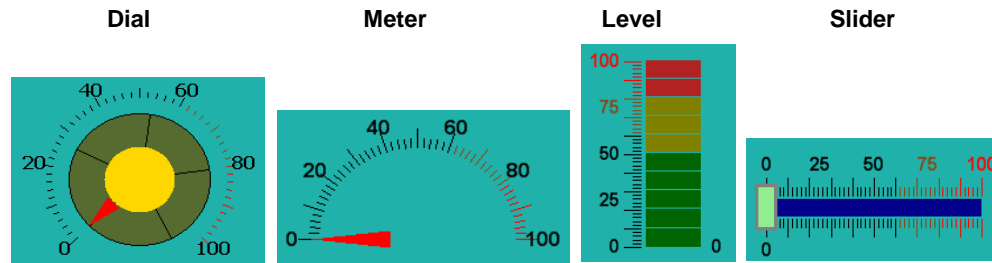

Drawing Tools

Line, Polygon, Rectangle, Ellipse, Arc, Pie

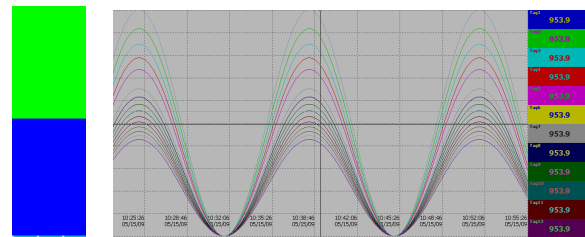**Dial**   **Meter**   **Level**   **Slider**

Components

Dial, Digital LED, Level, Meter, Slider, Switch, Thermometer

Sampling Tools

Digital values, Bar graphs, Historical Trends, Real Time Trends, Real Time Alarms & Historical Alarms

Special Functional Buttons

Page Control, Alarm Control, Historical Trend Control, Schedule Control & Data log control

Project explorer

This for for quick access of main tasks. Page Creation, Tag data base addition, PLC driver configuration, Scheduler, Recipe, Events/Alarms, Data Logging, User Scripts, Security & MultiLanguage

Editing Tools

Undo, Redo, Cut, Copy, Paste, Delete, Search, Show grid, Align to grid, Build, Download, Bring to Front, Sent to back, Lock, Group & Ungroup
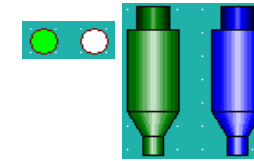
Align tools: Left, Center, Top, Right, bottom & Middle

Size adjustment tools: Make same width, height, size, Size to grid, Horizontal/Vertical space -equal, increase,decrease &Remove
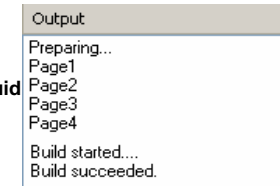

Animation Features

Color change, dynamic real time (Foreground/Back ground), Flash, Position (Diagonal, Vertical, Horizontal) & Visibility


Project Compile

It is to check problems in application development like syntax errors, missing tags for objects etc. After succesful compilation, it creates a buid for Downloading to HMI


Offline Simulator

To test HMI project in Offline at PC during application development. It is possible to enter tag values via Tabular caulmn, simulate the tag values and then check the behaviour and properties of components & objects with out downloading HMI project build to HMI
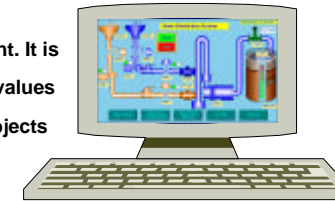
Online Simulator

To test HMI application in PC by connecting PLC directly to PC. By default, Online simulator in PC works for 2 hrs time duration.It requires to buy License for using Online Simulator function contineously with out any time limit in PC. Then, it becomes SC
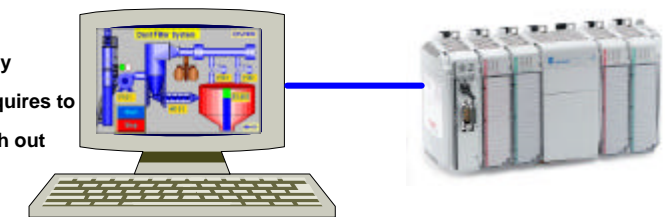
Project Download methods

Ethernet, COM1, COM2 Serial Ports & Removable disk
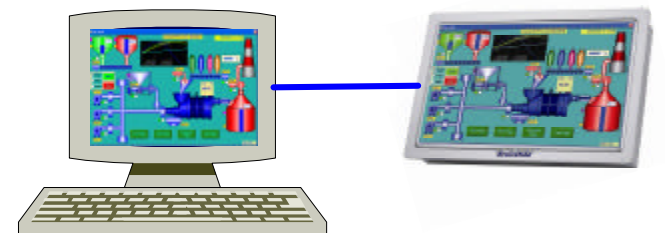
Programming in C#

It allows to develop high end HMI application using C# and it is useful for advanced programmers

Panel Studio Features

Quick retrieval by Tabs

All edited tools including pages in Project explorer can be accessed quickly using tabs from Main screen working area For ex: If user has edited 3 screens, tagdata base, alarms, all these can be accessed using tabs from main screen itself for quick retri

| Template | Page1 | Page2 | Page3 | Page4 | Page5 | Page6 | Page7 |

Reusable screen templates

Any screen in the project can be saved as template in specified folder and these pages can be reused in another projects of HMI with same size. This helps rapid application development for the programmer and save time by development manhours and project costs
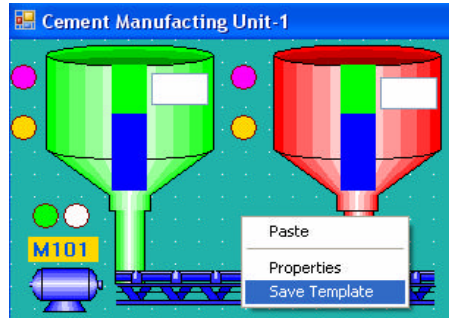
Multiple drivers and Data exchange

It is possible to simultaneously exchange data from different PLC's to HMI via different ports simultaneously. Then, tools are available in HMI software to copy Tags from COM1 port to COM2 or Ethernet or to Internal memory and vice versa for further usag

Smart Panels

PLC (Vendor 1)
Ex: Allen Bradley, DF1

PLC (Vendor 2)
Ex: Siemens, MPI

COM1

COM2
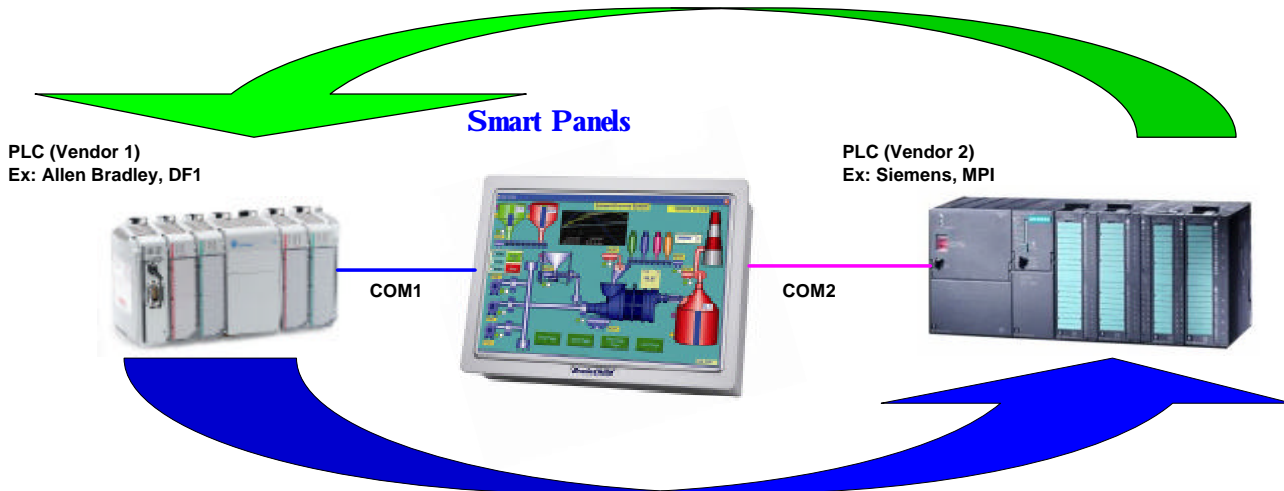
Historical data archival

Historical data and Events are stored in Internal memory first, then transferred to USB flash driver or SD card. Advanced and user friendly Data acquisition tool is used in PC to archive historical data.events stored in HMI. The features of Data acquisition software include the following

Display Historical trend
Display Historical alarms/Events
Display Reports (Daily, Weekly & Monthly)
Display Historical values in tabular column

Mark Remarks on data (comments)
Search data by Time, Timer Period, Event/Alarm, tag wise and Remarks
View trends both Horizontally and Vertically
Zoom out & Zoon In
Display view options available at 1 sec/dot, 2 sec/dot, 5 sec/dot, 10 sec/dot, 20 sec/dot, 30 sec/dot, 1 min/dot, 2 min/dot, 5 min/dot, 10 min/dot, 30 min/dot, 10 min/page, 30 min/page, 1 hr/page, 2 hr/page, 4 hr/page, 8 hrs/page, day/page, week/page and Month/page
Display white back ground/black background
Print trend view, Event/Alarm list, Reports & Tag Values

Export data and alarms/events to CSV files. (Specify time or time period or all)

Scheduler types

Countdown	To trigger an action one time after elapse of time
Repeat Countdown	To trigger an action repeatedly as per sepecified time interval
Daily	To trigger an action every day at specified time
Weekly	To trigger an action weekly once at specified time
Monthly	To trigger an action Monthly once at specified time
Conditions for Trigger	Possible to write expression via script/Macro programming

Script, supported functions

System functions	Predefined system functions like ack.alarms, start/stop scheduer etc.
Math functions	Trignometric, Log, Exp, Round, Power etc.
Arithmatic functions	Addition, Subtraction, Multiply, Division, Remainder
Logical functions	And, Or, True, False, Not etc..
Shift functions	left, Right
Relational functions	"=, !=, >, <, <=, >="
Assignment functions	"=, +=, -=, *=, /=, %=, &=, !=, <<=, >>="
Selection functions	If, Else
Iteration functions	While, For
Jump functions	Break, Continue
User tag	User tag list to use in script

Alarms
Real Time, Historical Alarms

Alarm Types	Alarm control functions	Job Types
Hi	Acknowledge	
Low	Dump	Log Alarm
High High	Clear	Log Auto Ack Alarm
Low Low	First page	Log Event
Dev +	Last page	
Dev -	page up	
Error	Page down	
Alarm Setpoint Reference	Constant or Tag	
Hysteresis	Available	
Conditions for Trigger	Possible to write expression via script/Macro programming	
Customized alarm message	Possible	

Data Logging

Log Trigger type	Log Speed
Timer	100 msec, 1,2,5,10,20,30 sec, 1, 5 & 10 min
Process value Change	
Max. data points	As per Predefined Set point

Log Method	Data Log Control	Historical trend control	
Instant	Start data logging	First page	Zoom in
Average	Stop data logging	Next page	Zoom out
Minimum	Clear data	Previous page	Zoom Al
Maximum	Dump data	Last page	

Special Function Buttons

Page Control functions	Navigate to Various pages- First, Next, Last, Previous, Page by number
Alarm Control functions	Dump, Clear, move to first page, last page, move to up alarm, down alarm
Historical Trend Control	Zoom In, Out, All, Move to First page, _Previous page, Next page, Last page
Data Log Control	Start/Stop data logging, Dump, Clear
Scheduler Control	Start/Stop specific schedule

Tag Database

Internal memory tag type	Digital, Analog, String, Date/Time
Tag Scan mode	Active page or Always
Tag Scan rate	100 msec to 10,000 msec
Simulation of Tag	Possible

Security

Number of users	100
Number of Levels	10
Password expiry period	Setting of No.of days or Unlimited option

Prevent operators from unauthorized access to applications, controls and screens

Fig: Schematic application

PC

USB Flash   Video Input (Option)

Microphone
Audio Input(Option)

Speaker
Audio Output (Option)

PLC

USB
(Client)

USB
(Host)

BarCode
Reader

IO Module

PLC

HMI

Controller

COM1

RS232

PLC
(Company A)

Ethernet to
Wireless
Client
Adapter

RS232C/RS422/RS485

Optional
Profibus, Profinet IO
Device Net, Ethernet/IP
CanOpen, Ethercat
CC-Link, Blue Tooth

Inverter

PLC
(Company B)

HMI

ETHERNET

USB
Serial
Ethernet

* Simultaneous communication possible at 2 nos.COM ports and Ethernet
* Support 1:N, Multidrop (One HMI to many PLC's) and N:1, Multilink (Many HMI's- One PLC) configuration as per Protocol specification

Optional Symbol Factory

Optional Symbol factory with thousands of high resolution symbols (vector graphics) for various industries are available in **Panel Studio Plus** software.
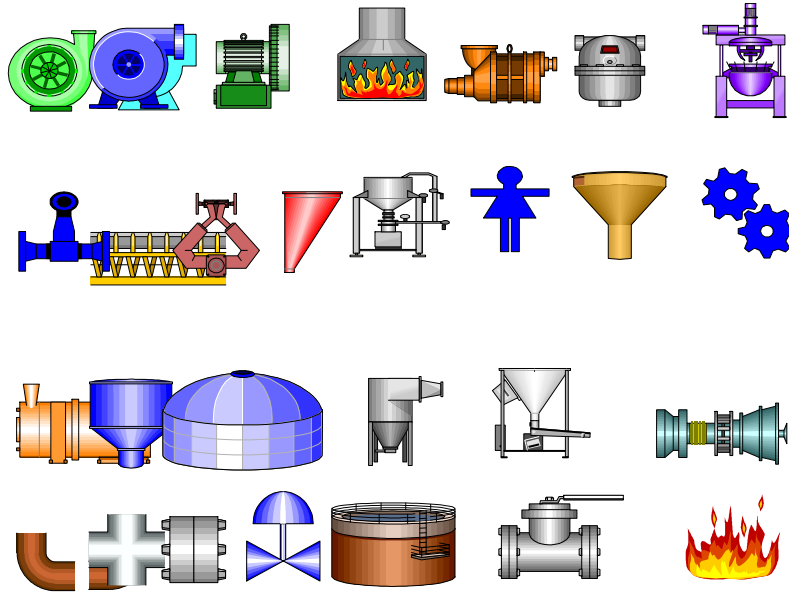
Categories

Air Conditioning	Finishing	Motors
Architectural	Flexible Tubing	Nature
Arrows	Flow Meters	Operator Interface
Ashrae Controls	Food	Panels
Ashrae Ducts	General Mfg.	Pipes
Ashrae Piping	Heating	Plant facilities
Basic Shapes	HVAC	Power
Blowers	Icons and Bitmaps	Process Cooling
Boilers	Industrial Misc.	Process Heating
Buildings	International Symbols	Pulp & Paper
Chemical	ISA symbols	Pumps
Computer Hardware	ISA symbols (3-D)	Safety
Computer Keys	Laboratory	Scales
Containers	Machining	Segmented Pipes
Controllers	Maps and Flags	Sensors
Conveyors, Belt	Material Handling	Tank Cutways
Conveyors, Misc.	Mining	Tanks
Conveyors, Simpl	Misc.Pipes	Textures
Ducts	Misc. Symbols	Valves
Electrical	Mixers	Vehicles
		Water and Waste water
		Wire & Cable

* Easy drag/drop of symbols to screen working area
* Transparent or background color can be selected for any symbols
* Animations are supported for symbols. Dynamic actions Color change dynamically in real time, Flash, Position (Diagonal, Vertical, Horizontal) & Visibility control
* Import bmp, wmf, jpg, gif & png files via Picture box tool available in editing software
* All symbols are vector graphics which occupies less memory
* With **Panel Studio** software, only first symbol in each category can be selected. If all the symbols are required, it requires

PLC drivers

Extensive driver list available for communication of HMI with Various PLC's, Inverters and third party devices via Serial (RS232, RS422, RS485) and Ethernet protocols. HMI can communicate on both serial ports and Ethernet simultaneously

Serial Protocols

Manufacturer	Protocol	Model
Allen Bradley	DF1 protocol	DF1- SLC 50X, MicroLogix, Control Logix, PLC5
Allen Bradley	DH485, DH+	PLC-5, SLC series, ML series, Control Logix series
Beckhoff serial	KS8000 protocol	BC8000, BC81XX, CX 90X0 & CX 10X0 series
Danfoss	FC protocol	VLT series, FC series
Delta	DVP serial	DVP-ES,DVP-EX,DVP-SS,DVP-SA,DVP-SX,DVP-SC,DVP-EH,DVP-EH2, DVP-SV,DVP-PM
Fatek	Fatek	FB series
Festo	Serial Fst	FEC series
Fuji	T-Link protocol	MICREX- F series
Fuji	Micrex Series protocol	SPH 200, SPH 300, SPH 300EX, SPH 2000
GE Fanuc	Series Ninety protocol (SNP)	Micro PLC,GE 90-30/ 90-70, Versa Max
GE Fanuc	SNP-X protocol	Micro PLC,GE 90-30/ 90-70, Versa Max
Hitachi	Hitachi Hi protocol	Micro EH, EH, & H series PLC's
IDEC IZUMI	Data Link	MicroSmart,OpenNet Controller,Micro3
Koyo	Direct Net, Modbus RTU	DL05, 06, 105, 205, 305 & 405 series
Koyo	K Sequence	DL05, 06, 105, 205 & 405 series
Keyence	ASCII	KV 700, KV1000, KV3000 & KV5000
Lenze	LECOM	8200, 9300 series?
LG	LG Cnet	GM series, MK series-K80S, K120S, K200S, K300S, K1000S, XGB & XGK series
Matsushita	Mewtocol	FP series-FP0, FP2, FP-X, FP-Sigma, FP2SH
Modicon	Modbus ASCII, RTU Master	Any device
Messung	Modbus RTU	Nextgen 2000, 5000 series
Moeller	CanOpen	XC100, XC200 series (Via Canopen option converter)
Mitsubishi	Melsec	FX, A, QnA & Q series, FX direct CPU port
Omron	HostLink	CV, CVMX, CX, CH, CS, CJ, CQM1H series
Siemens	PPI	S7-200
Siemens	MPI	S7-300/400
Schneider	UniTeleway	TSX-Micro & TSX series
Toshiba	Computer link,T series serial	S2E/ST2 series
Toshiba	T1-micro series serial	T1-Micro
Vigor	Vigor Serial	M, VB, VH series
Yaskawa	Memobus- MP Serial	Memocon, MP-900 & MP-2000 series
Yaskawa	Inverter serial	Varispeed, F7, G7, L7, VS series
Yokogawa	Factory Ace FA-M3 serial	FA-M3 model F3SPX series

Ethernet Protocols

Manufacturer	Protocol	Model
Allen Bradley Ethernet	Ethernet/IP, CIP	Micrologix, SLC 500, PLC-5, Control Logix
Beckhoff Ethernet	Beckhoff Ethernet	CX90X0 & CX10X0
Delta Ethernet	Delta Ethernet Protocol	DVP-SV series
Fatek Ethernet	Fatek Ethernet	FB series
Festo-Ethernet	EasyIP Fst	FEC series
GE Ethernet	SRTP	GE 90-30/ 90-70, Versa Max
Hitachi Ethernet	H series Ethernet	EH and H series PLC
Koyo Ethernet	Direct ECOM	DL05,06, 205, 405
Keyence Ethernet	Keyence Ethernet	KV 700, KV1000, KV3000 & KV5000
LG Ethernet	LG Fast Ethernet	GM series, MK series 200S, 300S, 1000S, XGB & XGK series
Modicon	Modbus TCP Master	Any device
Mitsubishi Ethernet	A, Q, QnA & FX Ethernet	A, Q, QnA & FX series PLC
Omron Ethernet	FINS UDP	CH,CS & CJ Series
Siemens S7 Ethernet	Siemens TCP/IP	S7-200,300, 400 (Connection Via CP card at PLC)
Toshiba Ethernet	Toshiba Ethernet	T, S2T, S2E series
Yaskawa MP Ethernet	Memobus Ethernet	MP-900 & MP- 2000 series
Yokogawa Ethernet	Yokogawa FA-M3 Ethernet	FA-M3 model F3SPX series

SmartPanels Ordering Code

HMI 450	1	0	0	1			0
HMI 730		0	0	0	0		0
HMI 750				1			
HMI 1050				1			
HMI 1550				1			

Power Input
1: 12 to 30 V DC
2: 90 to 250 V AC

Video input
0: None
1: Yes

Sound Input/Output
0: None
1: Yes

SD card Slot
0: None
1: Yes

Communication
0: None
1: PROFIBUS
2: PROFINET
3: DeviceNet
4: EtherNet/IP
5: CANopen
6: EtherCAT
7: CC-Link
8: Bluetooth

Software
0: Basic Editing & Data acquisition software *Panel Studio*
1: Extensive Software *Panel Studio Plus* with Symbol Factory

Enclosures
0: Standard - HMI 450: all plastic, HMI 730, 750: alloy front, plastic rear, HMI 1050, 1550: alloy front, metal rear
1: Stainless Steel front, metal rear for Food, Beverage & Pharmaceutical industries, HMI 750, 1050, 1550 only

Optional Accessories

Part Number	Description
CC94-1	RS232 interface, PC to HMI application download cable, 2 meters std.length
	RJ45, Ethernet Cross Over , PC to HMI application download cable

Note: Please refer ordering code of PLC cables, protective screen covers, SD card to HMI accessories list

BrainChild

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