Note: word between "quotation marks" are the word use by people who speak Johnson language.
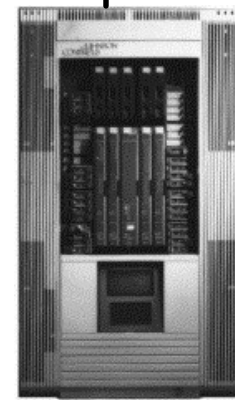
"Metasys" Family

N1 BUS (Arcnet Coax)

"OWS": Operator Workstation
"PMI": Metasys software
Person machine interface

"NCU": Network Control Unit
This picture is a "5 slot".
An NCU is the complete packcage; NCM, XBN, DCM, "base frame", panel etc...

Laptop of the "SYSTEM REP":
Johnson Technician

Software:
see page 5   PMI (Metasys)
             DDL,
             GPL,
Configuration GX-9100,
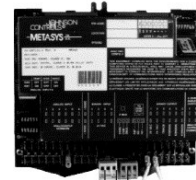software   HVAC Pro,
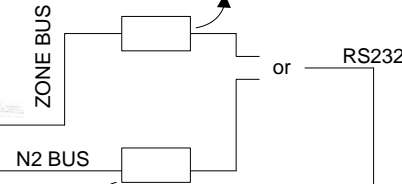see page 4   LCPGFG,
             DSC Tools,
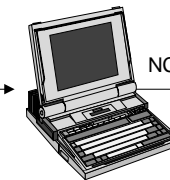
NC DIRECT

"NCM": Network Control Module
This picture is a NCM200.
(Arcnet only).
Now replaced by NCM300 ou 350
(see page 2).

"CVTPRO":AS-CVTPRO100-1
Cable for communication between UNT, VAV, VMA, AHU, by the zone Bus or N2
Ancestor of the "CVTPRO",discontinued.
"Cable Pro": AS-CBLPRO Cable Kit for HVACPRO
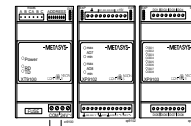Communication with LCP by the service port

N2 BUS

"XTM": Extension Module
XT/XP direct on N2 BUS or XT BUS (DX9100).
Configure via **XTM Configuration**.

N2 BUS

"AHU": AS-AHUXXX Air Handling Unit Controller
Application specific controller: Air handler controller, configure only not programmable
Configure with HVAC Pro
I/O 8AI (0-10V, 4-20mA, RTD)
    8BI
    10BO (ON/OFF)
    8AO (4-20mA)

ZONE BUS

or   RS232

N2 BUS

Ancestor of the "CVTPRO",discontinued.
"CVT": MM-CVT101-0 N2 Converter
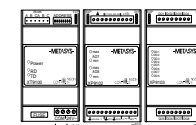RS232 to RS485 (N2 Bus) converter for all N2 device

"DX": DX-9100 Extended Digital Controller
programmable controller via GX-9100.
I/O 8AI (0-10V, 4-20mA, RTD)
    8BI
    8AO (0-10V, 4-20mA (AO1,2,9,10 only))
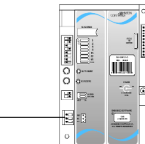   6BO (ON/OFF, DAT, PAT)
Expansion via XT Bus

Laptop

"XT": XT-9100 Extension Module
Communication between "DX and "XP"
"XP": Expansion Module
XP-9102: 6AI (0-10V, 4-20mA, RTD non calibrable)
         2AO (0-10V, 4-20mA)
XP-9103: 8BO
XP-9104: 4DI, 4DO
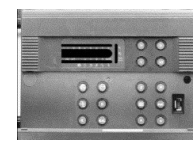XP-9105: 8DI
XP-9107: 4BO

XT-BUS

"N2 Dialer or NDM": N0-NDM101-0, N2 Dialer
N2 bus on phone line module
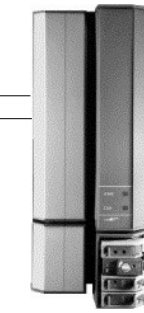Configure with **HVAC Pro** or **NDM Configuration**

Modem

Modem

"LCP": AS-LCP100 ou 200 Lab and Cental Plant Controller
Ancestor of the "DX", discontinued.
Programmed with LCPCFG (DOS graphic application)
I/O 8AI (0-10 V, 4-20mA, RTD)
    8BI
    2AO (0-10V, 4-20mA)
    6BO (ON/OFF, DAT, PAT)

"UNT": AS-UNTXXX Unitary Controller
Application specific controller for terminal and small equipment (Roof top, fan coil etc...) and simple custom application.
Configure via HVAC Pro
I/O 6AI (0-10V, RTD)
    4BI
    8BO or 6BO
    0AO or 2AO (0-10V)

"TC": TC-9102-xxxx Terminal Controller
Application specific controller for terminal equipment only
Configure via HVAC Pro
I/O Depend on model

Note: word between "quotation marks" are the word use by people who speak Johnson language.

N1 BUS
(Arcnet Coax)

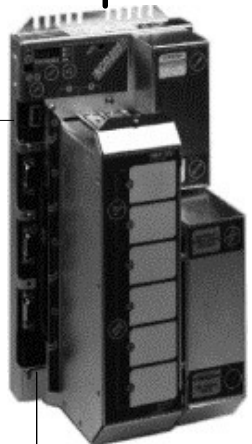**N1 BUS** (ETHERNET IP)

The Communication Processor requires two slots in a MOD HR3 chassis.

"Router": JC-EP-RG Metasys Embedded Ethernet router
Router Arcnet to Ethernet
Configure with VT100 (Procomm or Hyperterminal).
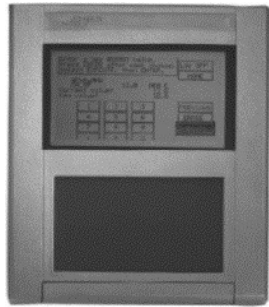
"NC ou NCM ou NCU": same expression for a NCM. Network Controller Module
This picture is a NCM300 ou 350 (NCM300 Arcnet only, NCM350 Arcnet or Ethernet).

"NT": I0-NTUXXX Network Terminal.
Hand held terminal for NCM see the entire network.
No configuration need.

"NCM": Program with DDL and GPL or JC Basic
"DDL": Data Definition Language
1) **"Net file":** setup the network (site) name and operator workstation (one "net file" by OWS).
2) **"Model file":** setup the "models" for N2 bus controller (most complicated concept in Metasys, one "model file" by network (site) .
3) **"Global file":** setup the N1 network (OWS, printer an NCM). Setup the alarms processing (Report Group), setup PC group (looking of the "Metasys map") and systems (one "global file" network (site)).
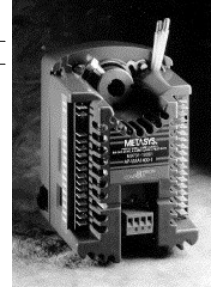4) **"NC file":** setup the NCM points (object). (One "NC file" by NCM).
"GPL" Graphique Programming Language
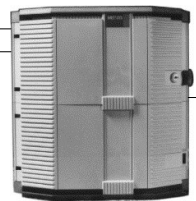**Graphique Programming** of NCM porcess object.
(We don't use JC Basic in Montreal)

N2 BUS

RS232

The N2 BUS is manage by the NCM, 9600 baud, 3 wire (Master/Slave).
All N2 device are not peer to peer (same for L2 of the DSC-8500)

"VMA": AP-VMAXXXX Variable Air Volume Modular Assembly (Nouveau)
VAV controller with integrated actuator.
Configure with HVAC Pro.

TTM

"TTM": Table Top Modem

"Integrator": AS-MIGXXXX Metasys Integrator
Communication with other vendor (Chiller, Boiler, etc)
Configure with VT100 (Procomm ou Hyperterminal) need VCT file from JCI.

RS232
To chiller

S2 BUS

DSC

FIC

"FIC": Remote i/O for DSC.
The DSC-8500 equivalent of XT/XP for DX-9100.
I/O 15AI (0-5V, RTD)
8BI
8BO one output can include 2 BO (A et B)
0AO (analog output are one pulse BO with feedback position on AI)

"ZT": AS-ZTUXXX Zone Terminal
Hand held or wall-mounted terminal for ASC (Application Specific Controller: UNT, AHU, VAV)
Configure via ZT Pro.

ZONE BUS

DSC
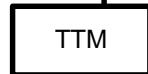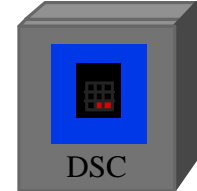
"DSC": DSC-8500 Digital System Controller
Old JCI DDC system
Program with Cal1 (JCI language, little bit similar to Basic)
I/O 15AI (0-5V, RTD)
8BI
8BO one output can include 2 BO (A et B)
0AO (analog output are one pulse BO with feedback position on AI)
DSC is a package of different component (FIC, PCR, CEB, TRS, TRM, CDB, CIB etc...)

"VAV": AS-VAVXXX Variable Air Volume Box Controller
Configure via HVAC Pro.

"Metasys bacnet" Family
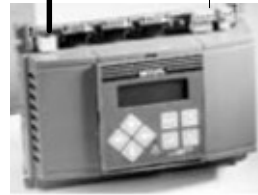
"N30": MS-N301xxx-1
Supervisory controller
Bacnet IP and N2 bus
No custom programming
Configured with Project Builder part of
MTool

"M3": M3 workstation
Bacnet workstation for N30 (not NCM)
or
Flat lonworks workstation

"M5": M5 workstation
Bacnet workstation for N30
and / or NCM
NCM is not bacnet, M5 run over PMI and
Data is transfert to M-application
(M-graphic, M-Alarm, M-trend etc) via an
N1 OPC server.

"UNT": AS-UNTXXX Unitary
Controller
UNT with more configuration capability.
Configure via HVAC Pro
I/O 6AI (0-10V, RTD)
    6BI
    8BO or 6BO or 4BO
    0AO or 2AO or 4AO(0-10V)

UNT1100 Series Controller

"TEC": AS-TEC110x-1
N2 bus Thermostat
No software configuration.
Was made by Robertshaw
discontinued
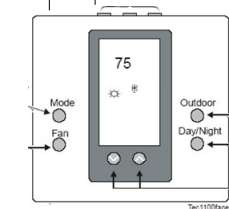
Figure 1: TEC1100

"TEC": AS-TEC210X-1
N2 bus Thermostat
No software configuration.
made by Viconics

There was also the Companion Metasys, is was a small supervisory system with one N2 bus, point limit number (200, 500 or 800), no complex custom programming, configuration with VT-100 emulator, no networking capability PC must connect RS-232 (direct or modem); replaced by the N30.

There was also the brand name Facilitator, for the distribution channel, it was a version of companion with an facilitator N2 bus and JCI N2 devices (AHU, UNT, DX9100, etc), the Facilitator N2 device cannot communicate with Metasys NCM or Companion. When they release the N30, there was a Facilitator N31, same as the N30 except without BBMD capability, the N30 and N31 communicate with both N2 facilitator and/or N2 Metasys.
The Facilitator system doesn't exist anymore.

Johnson Controls Metasys configuration Softwares

"LCPCFG": for LCP (in DOS)
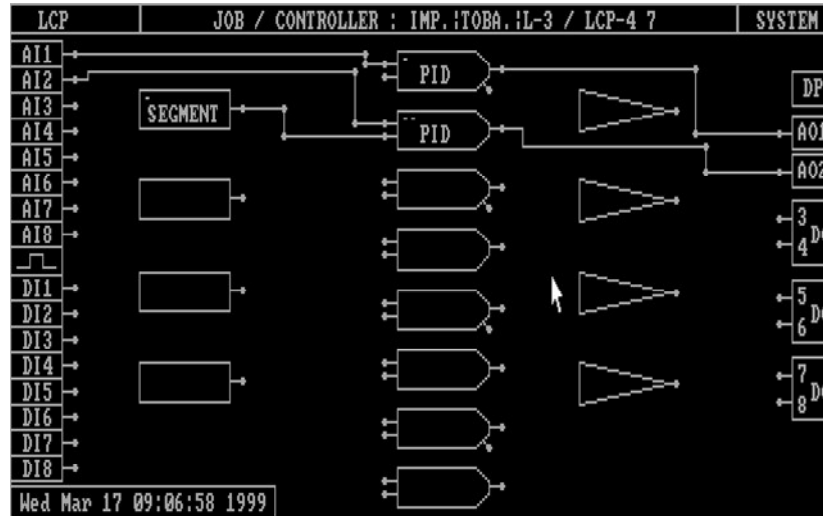
"HVACPRO": for AHU, UNT, VAV, VMA, TC-9102, NDM, ZT PRO, N2 Bus information
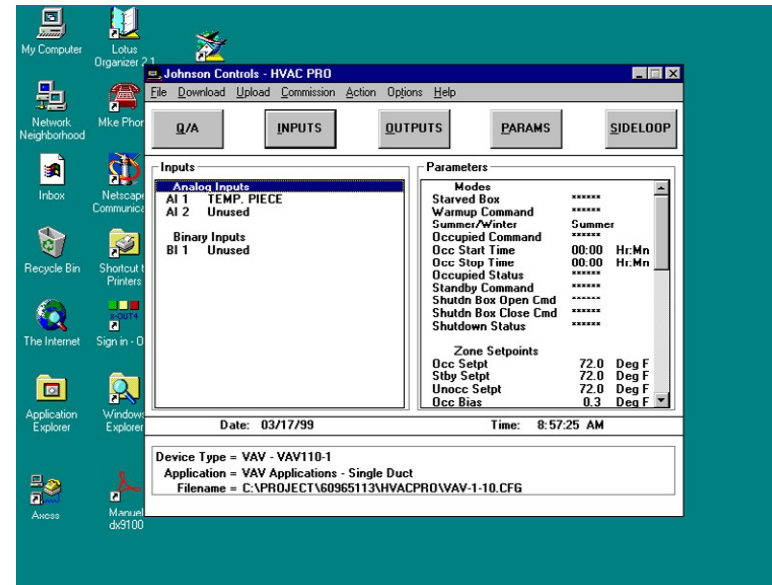
"GX-9100": for DX-9100, XT/XP
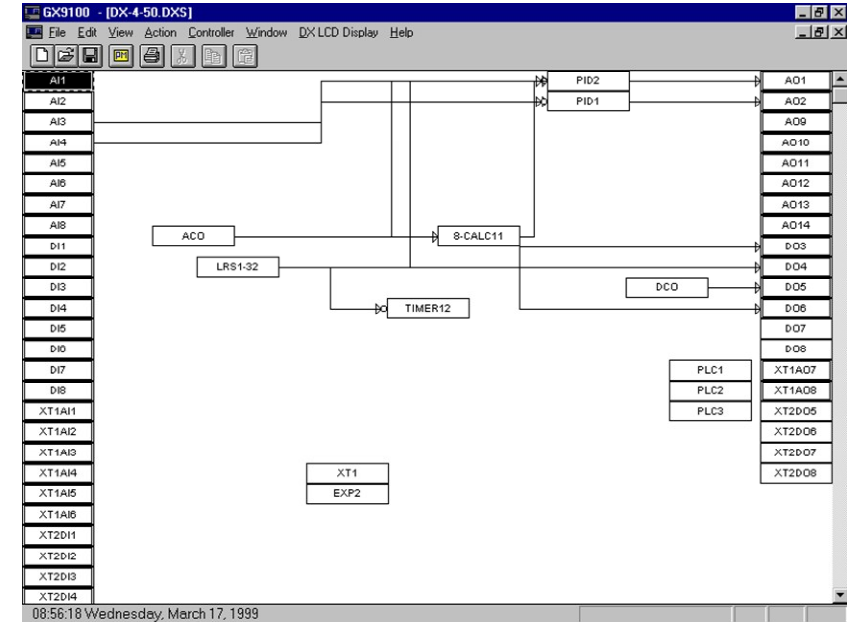
"GPL": for NCM process (in DOS), can be done also with JC Basic (Line programming)

"DDL": for NCM
(edit with any text editor, can be done online with PMI)

"CAL1": for DSC-8500
(edit with any text editor)

Johnson Controls Metasys PMI Softwares

"PMI": METASYS software (end user and setup software), main screen "METASYS MAP"

Example of a system windows (in text mode)

NETWORK MAP-SRC

Item Edit View Action Go To Accessory Summary... SetUp Exit Help

SRC\HVAC\EVAC

"network name" → SRC
"pc group" → FEU — SYSTEME D'INCENDIE
HVAC — VENTIL.CHAUFF.REFROID.
EVAC — EVACUATION
"system" → EVAC_F-E — EVAC.FUMEE EST
EVAC_F-O — EVAC.FUMEE OUEST
ZN-01-17 — ZONE 01 @ 17
STUDIO — STUDIO
AIR-F — AIR FRAIS
ZN-70-96 — ZONE 70 @ 96
CIR — C.I.R.
GESTION — GESTION
TRANFER — TRANSFER SWITCHES
COMPRES — COMPRESSEURS
NCU — MATERIEL DES NCU
SYSTEMS — SYSTEMS
DEVICES
"ncm" → NC01 — TK.3 CNT.DIGITAL 1
NC02 — TK.2 CNT.DIGITAL 2
NC03 — TK.1 CNT.DIGITAL 3
NC04 — TK-N2 CNT.DIGITAL 4
NC05 — TK-N2 CNT.DIGITAL 5
"ows" → OWS100 — POSTE DE CONTROLE OWS 1
OWS101 — POSTE DE CONTROLE OWS 2
OWSNC01 — POSTE OPE. NC01 PORT 3
PC PODIC — POSTE OPERATEUR A DIST

Example of a system windows (in text mode)

6_A

Item Edit View Action Go To Accessory Help

SRC
HVAC — VENTIL.CHAUFF.REFROID.
ZN-01-17 — ZONE 01 @ 17
6_A — ZONE 6 V.T.R.

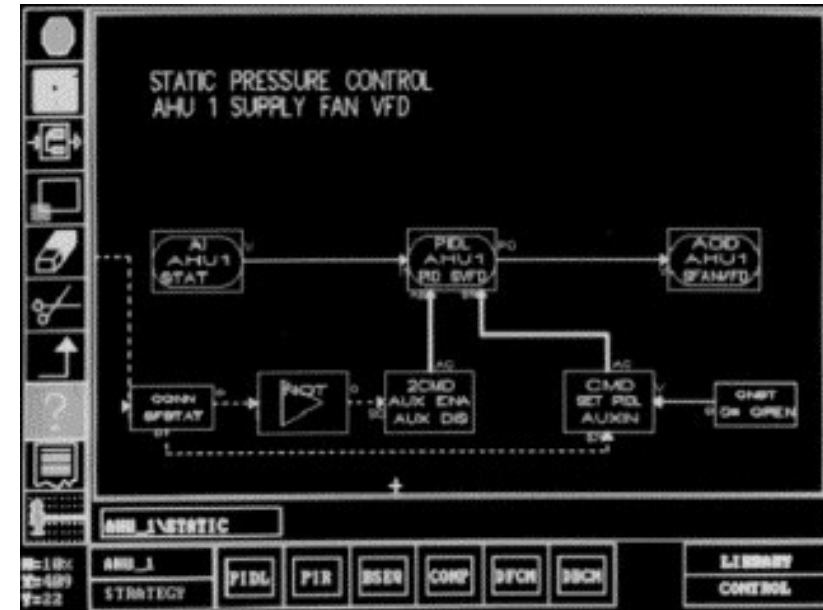| Status	Item	Description	Value	Units
	SEQ_OPE	SEQUENCE D'OPERATION	_	
	---V---	------VENTILATEUR------	_	
	C_VA	COMMANDE VENT. ALIMEN.	MARCHE	
	E_VA	ETAT VENT. ALIMENTATION	MARCHE	
	A_VA	ALARME VENT. ALIMENT.	NORMAL	
	---P---	--------POMPES--------	_	
	P_PEC	PERMIS. POMPE EAU CHAUDE	MARCHE	
	C_PEC	COM. POMPE EAU CHAUDE	MARCHE	
	E_PEC	ETAT POMPE EAU CHAUDE	MARCHE	
	A_PEC	ALARME POMPE EAU CHAUDE	NORMAL	
	E_PEF	ETAT POMPE EAU FROIDE	MARCHE	
	A_PEF	ALARME POMPE EAU FROIDE	NORMAL	
	--GF--	------GAINE FROIDE------	_	
	PC_GF	PC GAINE FROIDE	13.0	DEG C
	R_GF	REAJUST. GAINE FROIDE	0.0	DEG C
	PC_A_GF	PC ACTUEL GAINE FROIDE	13.0	DEG C

Example of an object windows

Analog Input Focus (SYS91)

Item Edit View Action Go To Accessory Help

System Name   6_A   Reports Locked   N
Object Name   T_GF   Trigger Locked   N
Expanded ID   TEMP. GAINE FROIDE   Comm. Disabled   N
                                         Comm. Status   ONLINE
Current Value   12.6   DEG C
                                         Status   NORMAL

Graphic Symbol #   0   Hardware: DX9100   Flags
Operating Instr. # 0   System Name NC04-HW Auto Dialout   N
                            Object Name DX-4-50 Enable PT History Y
                            HW Reference AI4   Save PT History   N

Parameters   **Engineering Data**
Warning Delay (min) 1   Analog Units   DEG C   **Report Type**
Warning Delay Active N   Decimal Position 1   NORMAL   CRIT4
                               High Alarm Limit 26.0   WARNING   NONE
                               Low Alarm Limit   10.0   ALARM   CRIT4
                               Setpoint
                               Normalband   **Messages**
                               Differential   2.0

Johnson Controls Metasys System Extended Architecture Examples

Web Browser — Printer — ADS with SCT

NAE45-1, NAE45-1, NAE55 — IP Network — Wide Area Network (WAN)

Field Bus (N2), Field Bus (N2), Field Bus (N2)

LONWORKS® Network

MetasysExtArch

Printer — ADX

Engineering Workstation OWS — Web Browser - User Interface

NIE85 — N1 — IP Ethernet

NCM — NCM

Field Bus (N2), Field Bus (N2)

NAE85 N1 Integration

Printer — ADS Server

User Interface and SCT — NAE55 — IP Network — BACnet® Network — N30

Field Bus (N2) — LONWORKS® Network — Field Bus (N2) — BACnet® Third-Party Device

Boiler — FSC Controller — NAE85

LONMARK® Third-Party Device — TCU Controller — Fan Coil

LON/BACnet Integration

Figure 13: Metasys System BACnet and LONWORKS Integration

Web Browser — Field N2 Bus — N2 Data Over RS-485 Bus

Internet — NAE5512 or NAE5513

Ethernet Network

Firewall — Tunneled N2 Data Over Wired Ethernet

SECVT Converter — N2 Data Over RS-485 Bus

Field N2 Bus
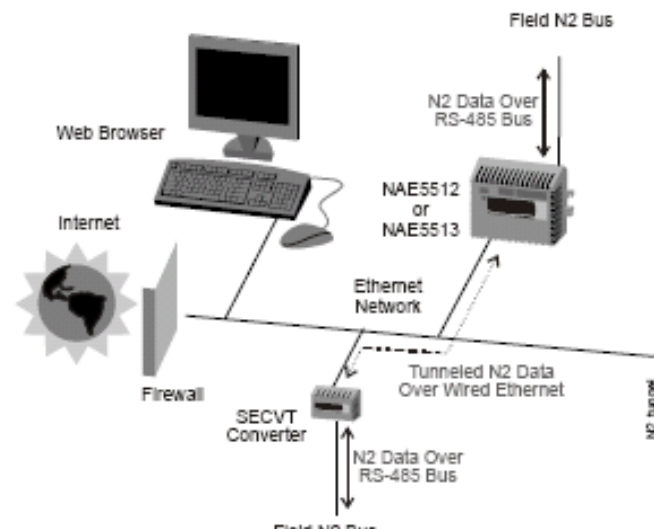
N2_tunnel

Figure 8: Data from N2 Devices Tunneled Over an Ethernet Network and a Wireless LAN

IP Ethernet — IP Ethernet

Excel 6000 Integration NIE — NIE55 — NAE55 — Remote Building

C-Bus

Excel 20 Controller, Excel 50 Controller, Excel 10 Zone Manager, Excel 80/100 Controller, Excel 500/600 Controller

E-Bus LONWORKS® Network

Excel 10 Constant Volume AHU Controller, Excel 10 VAV Controller, Excel 10 Unit Ventilator Controller, Excel 10 Fan Coil Unit Controller, Excel 10 Remote I/O Device

Figure 6: Excel 5000 System Integration Configuration

NAE

The NAE is a Web-enabled, Ethernet-based supervisory controller that monitors and supervises networks of field-level building automation devices that typically control HVAC equipment, lighting, security, and building access. The NAE provides features including alarm and event management, trending, archiving, energy management, data exchange, scheduling, dial features, and password protection through its embedded Web-based UI. Different models and options support various communications protocols including N2 Bus, BACnet, and LONWORKS network devices. The NAE55 Series supports a comprehensive set of supervisory features and functions for large facilities and technically advanced buildings and complexes. The NAE45 and NAE35 Series extend the power of the NAE to the smaller building and enables the wider distribution of supervisory functions in larger facilities. The NAE85 supports large BACnet integrations via Ethernet.

NIE

The NIE is a Web-enabled supervisory controller for integration of N1 Networks. The NIE is a specialized version of the NAE and is designed to provide for the migration of N1 networks into the Metasys system extended architecture. The NIE uses the same UI as the NAE, except that connectivity with LONWORKS, BACnet, and N2 networks is not available in the NIE. The NIE85 supports large N1 integrations.

System Configuration Tool (SCT)

The SCT assists in all phases of engineering, installing, and commissioning of devices that make up the Metasys system. The SCT can be used offline to create archive databases that can be downloaded to an NAE, NIE, ADS, or ADX. The SCT also allows you to upload and archive databases from an NAE, NIE, ADS, or ADX that were created or modified online. Using the SCT, you can view and configure multiple sites in one archive. The SCT uses the same UI as the NAE/NIE and ADS/ADX. The SCT also provides a Simulation feature, which allows you to simulate a building automation device and test the database's control logic prior to downloading it to an NAE.

The SCT allows commissioning of N2 devices by allowing HVAC PRO software, GX-Tool software, and XTM Configurator software to access the devices on the N2 Bus of an NAE.

The SCT is a separate software installation included on the ADS/ADX installation CD.

ADS

The ADS is a Metasys server running on a computer that consists of two components. The first component is the relational database management system Microsoft SQL Server™ 2000 Desktop Engine (MSDE 2000) for storing collected trend data, audit trail messages, and event messages. The second component is the Web server software that provides user interface access to data and routes commands to the Metasys system. This component may include the Site Director function.

The ADS provides browser access to the entire system and serves as a repository for archives. These archives include historical data, such as trend and alarm histories, and operator transactions, for example, providing information for additional reports and applications. The ADS also:

- supports multiple, simultaneous international languages at the user interface

- provides printer destinations for alarms

- allows a greater number of simultaneous users than is supported by the NAE/NIE

ADX

The ADX is a version of the ADS with extended capabilities for historical data archiving and extends the multi-user Web access capabilities of the system. The ADX supports the relational database management system Microsoft SQL Server 2000 for storing collected trend data, audit trail messages, and event messages. This relational database is also used to store configuration information for site security and trend studies and other features.

The ADX can also be installed in a split configuration with the ADX software/user interface on one computer (the Web/Application server) and the historical data on another computer with Microsoft SQL Server 2000 software (the Database server). In a split configuration, you can place your database server behind a firewall for an added layer of data protection.

Serial to Ethernet Converter (SECVT)

The SECVT enables N2 Tunneling over an Ethernet network. N2 devices can be directly connected to an Ethernet network through an SECVT to communicate with a supported NAE55 model (NAE5512 and NAE5513). The SECVT converts N2 data to Internet Protocol (IP) packets and transmits them to the NAE across an Ethernet Local Area Network (LAN). Up to 32 devices may be clustered per single SECVT. The SECVT uses a Web-based UI for commissioning and diagnostics.

LN Series Controllers

(From Distech Controls)

see: www.distech-controls.com

The LN Series controllers allow you to take advantage of interoperability, economies of scale and Metasys® building management system technology. LN Series controllers are LonMark certified with full-featured LNS based plug-ins so individual controllers can be quickly set up. This technology is ideal for buildings of all sizes and control requirements that want to benefit from the flexibility, performance and energy savings offered by Metasys systems. Choose from a variety of devices and controllers, including simple displays, programmable controllers, application specific controllers and networked thermostats to create the control system that is best for your facility.

LN programmable VAV zone controllers can be quickly set up for a variety of applications.

LN configurable thermostats are designed for single stage and multi-stage control of heating/cooling equipment.
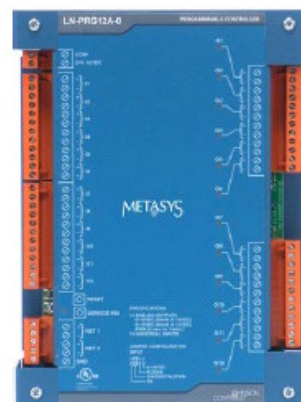
LN application controllers are designed for fan coil, roof top, heat pump, unit ventilator and other HVAC applications, as well as access control.

The LN display provides an LCD interface, provides access to any LonWorks device and manages up to 16 different zone schedules.

The Metasys® system LN Series Free Programmable Controllers are microprocessor based free programmable controllers, designed to control various Heating, Ventilating, and Air Conditioning (HVAC) applications.

Figure 1: Metasys System LN Series 24 Point Free Programmable Controller

FACILITY EXPLORER BY JOHNSON CONTROLS

Johnson Controls, Inc., the global leader in facility management and control, is introducing a new building control system, Facility Explorer, exclusively available through the company's Authorized Building Control Specialist (ABCS) network.

Niagara Framework is a registered trademark of Tridium, Inc.

Powered by **niagara** AX FRAMEWORK™

Facility Explorer provides industry-leading Web accessibility beyond just the supervisory level, allowing you to see and act on vital systems information from more places than most other systems have access to. This high level of visibility means you can resolve problems faster, maintaining occupant comfort and minimizing

Facility Explorer's interoperability gives you seamless connectivity to BACnet®, LonWorks®, and Johnson Controls N2 Open Controllers, which gives you more possibilities for future expansion and upgrades. Facility Explorer controllers and displays also support software-based integration gateways for devices that use proprietary or industry-specific protocols.
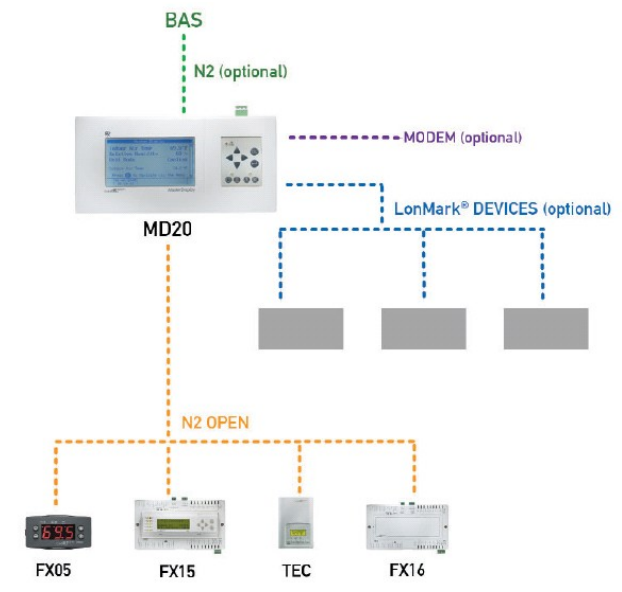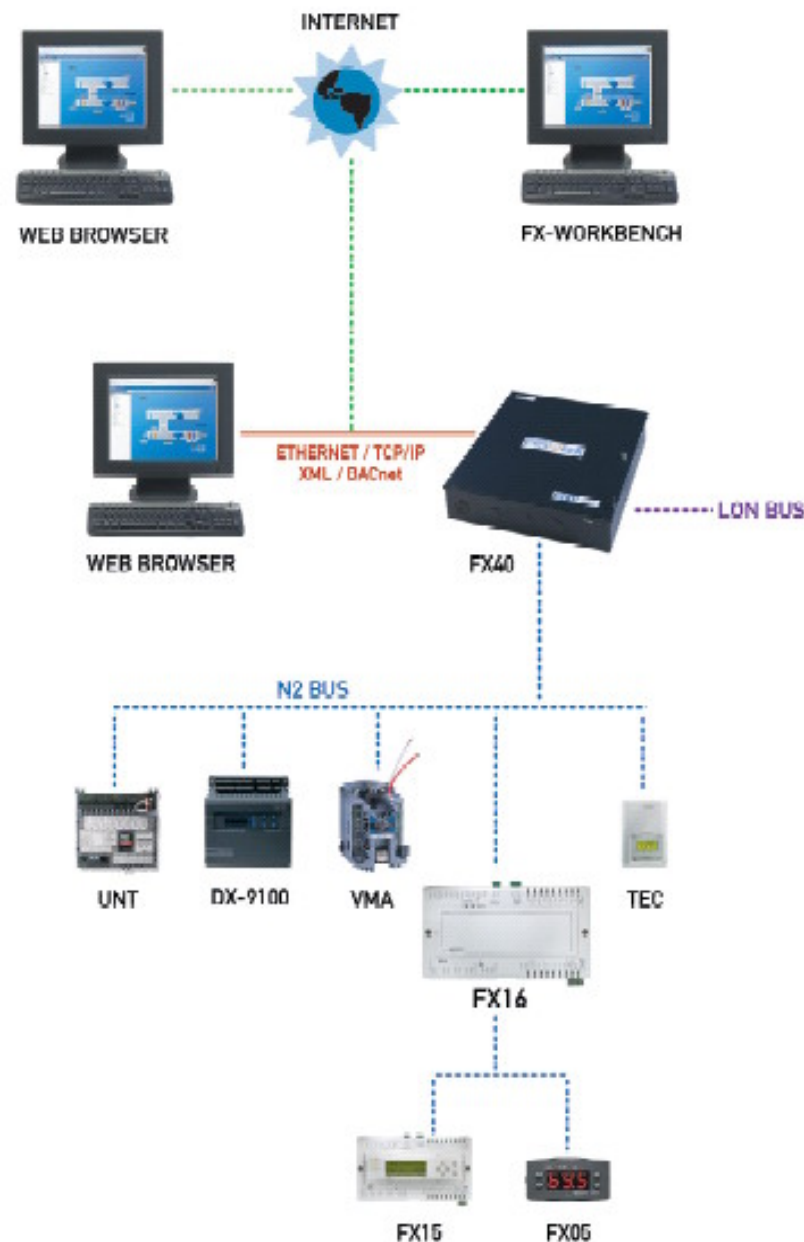
Supported Device Types

The FX40 supports up to 100 devices on its communication trunks, including any combination of the following supported device types:

- N2
  - FX field devices fitted with N2 communication cards
  - N2 ASCs (VMA, DX-9100, UNT, VAV, AHU)
  - N2 compatible devices (VND)
- LonWorks
  - FX field devices fitted with LonWorks communication cards
  - Third party LonMark® compliant devices
- BACnet IP/Ethernet
  - N30
  - Third party BACnet devices compatible with FX40's PICs statement

Full Suite of Building Automation and Control Features

The FX40 features a comprehensive suite of building automation and control features including the following:

- Event/occupancy scheduling
- Trending
- Alarming
- Totalization
- Energy management
- Network wide data sharing
- User access with password protection
- Rich, graphical representation of system information
- Time synchronization
- Custom control