

Batch Process

High Level

Tank1

62.94

Tank2

0.50

Ingredient 3

Setpoint

Level

S E R I E S

X16PDM

PROGRAMMABLE
DIGITAL MONITORS



RONAN

ENGINEERING
COMPANY

The Ronan Series X16PDM Programmable Digital Monitors are the latest generation of Ronan's state-of-the-art digital input machine interface and remote annunciators offered in most common mechanical configurations.

The systems in the X16PDM Programmable Digital Monitors feature high density input field contact capacity with remote indicator light output.

A system common trouble and a per-point auxiliary relay output may be utilized for field contact repeater or for remote group alarms. The system monitors internal routines and the communication backbone, signaled by dedicated LED or relay contact closure.

X16PDM is equipped with a host interface module that provides advanced communication interface protocols to interface with an external host computer, local network, or plant network.

F E A T U R E S

INPUT

- Dry Contact System Powered 24 Vdc
- Normally Open/Normally Closed
- Live Contacts (Isolated)
- 24 Vdc, 48 Vdc, 125 Vdc or 115 Vac, 240 Vac

SEQUENCE

- All Standard ISA Sequences – User Configurable

OUTPUTS

- Dual Audible – Configurable
- Auxiliary Contact
 - Double Throw Selectable
 - Normally Energized or De-energized
 - GP or HS Relays
 - May be Added in the Field
- Common System Trouble Alarm
- Reflash System Trouble Alarm
- Serial Alarm Output Protocol
 - Ronan Proprietary
 - MODBUS RTU Slave
 - TCP/IP
 - DNP 3.0
- Alarm Serial Interface
 - Object Link Embedded for Process Control (OPC)

DESIGN TECHNOLOGY

- Microprocessor Based
- High Noise Immunity
- Field Proven Off-the-shelf Worldwide
- Serial Input/Output
- Comprehensive User Configuration with Standard Windows Software

MECHANICAL

- Relay Rack and Surface Mounting
- Light Weight
- Reinforced Terminal Block

WARRANTY

- Three (3) Years

APPROVALS

- UL – Underwriters Laboratories
- CE – Cenelec
- CUL – Canadian Underwriters Laboratories



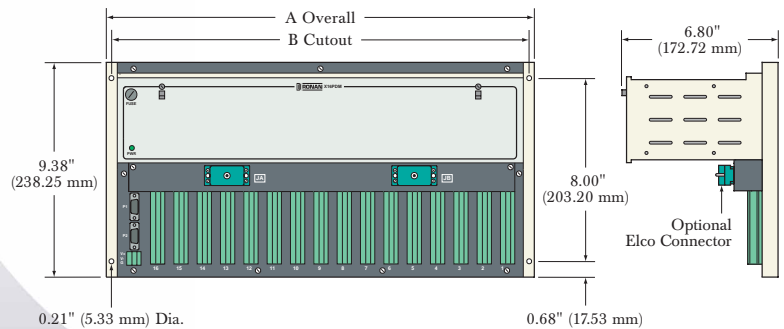
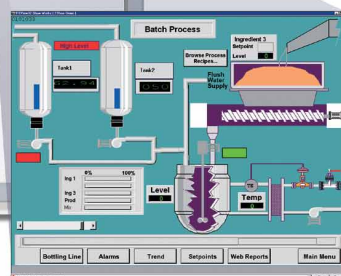
The Ronan X16PDM Programmable Digital Monitor Systems are designed for the needs of the process and power industries where field inputs and electronics are required to be some distance away from the display or indicating lamp cabinets, such as Relay Rack Room from Control Room, using multiconductor lamp cabinet cables. The systems provide all the basic features of an annunciator in a small, high density module chassis. A system common trouble alarm and a per-point auxiliary relay output may be utilized for a field contact repeater

or for remote group alarms. The per-point optional auxiliary relay module, equipped with one to four relays, provides a selectable form A or B type dry contact. A system common reflash output allows remote annunciation of any window going into alarm.

Similar to the X11CA Window Annunciator, the Programmable Digital Monitor provides serial output of alarms in many industry standard protocols to Host computers, Human Machine Interface (HMI) computers, PLCs and DCS.

SURFACE-MOUNT REMOTE LOGIC CHASSIS

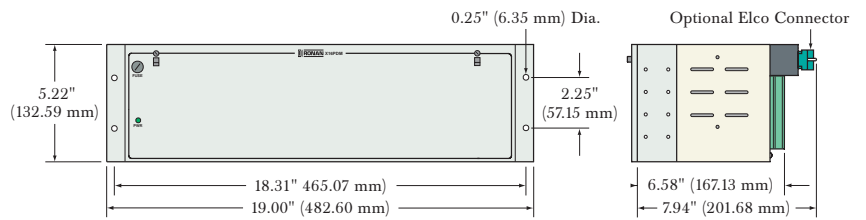
The Ronan X16PDM-SM Surface-mount Remote Logic Chassis are designed in two sizes of 32 point and 64 point logic inputs. The chassis is used to mount in NEMA enclosures with standard termination facility of Weidmueller or custom termination of various industry standard terminal blocks. The system is interfaced to HMI computers through its serial output using industry standard OPC interface via the Host interface module. The system can also interface to one of many types of Ronan lamp cabinets or mosaic cabinets through multiconductor lamp cables or individual wires. The system is widely used in applications where field contact status is to be displayed on graphic displays operating in a door mounted industrial computer, or a visual lamp cabinet mounted on the door of the enclosure.



Model	A Overall		B Cutout	
	Inches	mm	Inches	mm
X16PDM-SM-64 ALM	18.70	474.98	18.25	463.55
X16PDM-SM-32 ALM	10.54	267.72	10.09	256.29

RACK-MOUNT REMOTE LOGIC

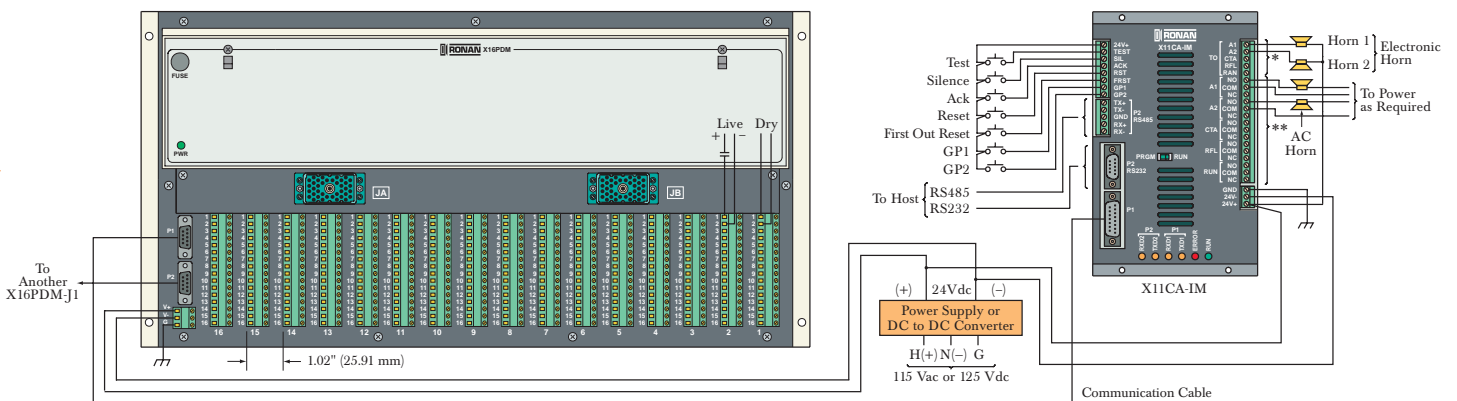
The Ronan X16PDM-RR Rack-mount Remote Logic Chassis are designed for standard 19.00 inch (482.60 mm) or 24.00 inch (609.60 mm) relay rack mounting. Field inputs and remote lamp outputs are accessed from the rear of the chassis via a multipin Elco connector or standard terminal block. The system is used for high density alarm input monitoring in power plants with remote lamp cabinet connection. The system provides a serial output, daisy-chainable to a host device, using industry standard communication protocols.



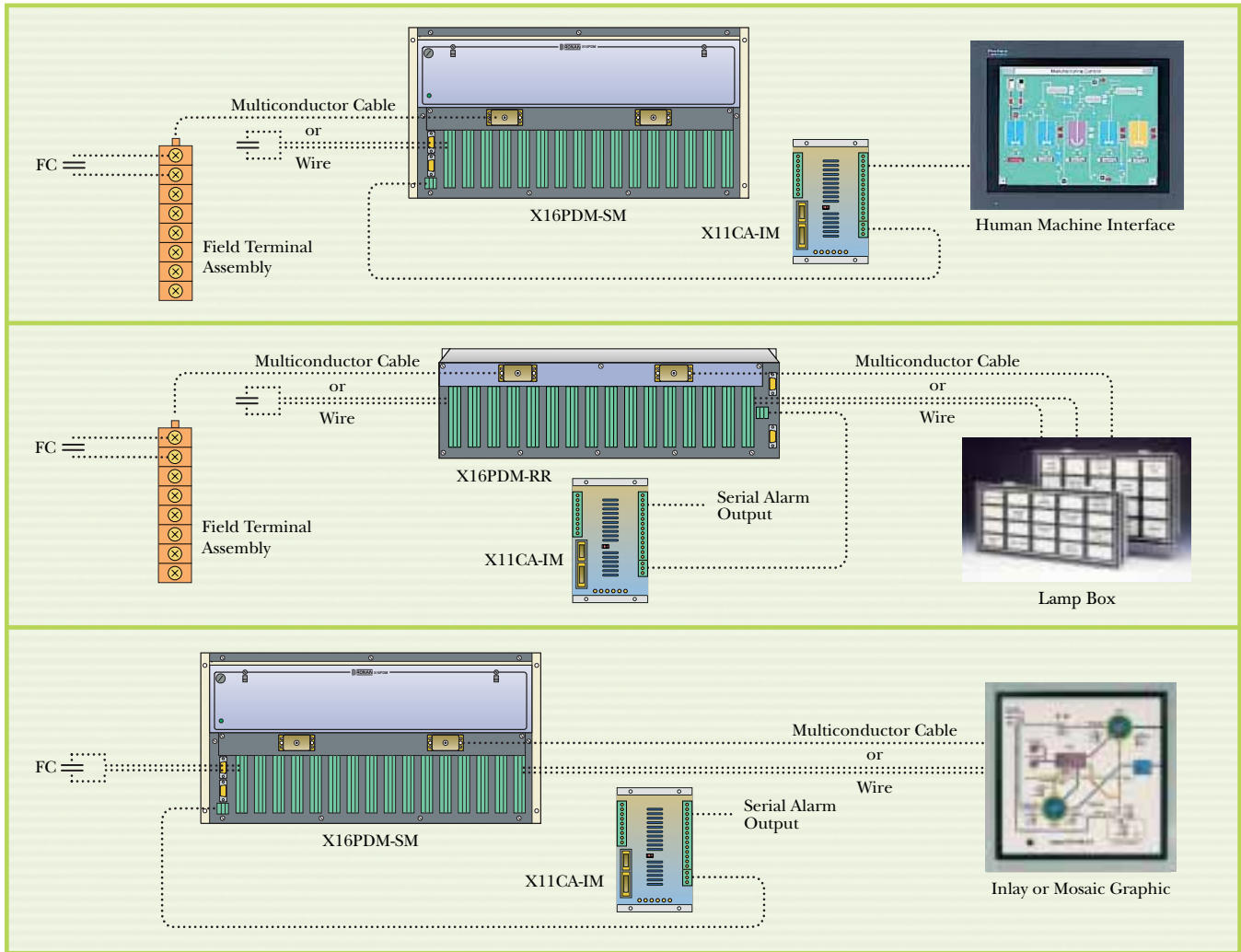
Filter Module

MODEL X16PDM-SM WIRING

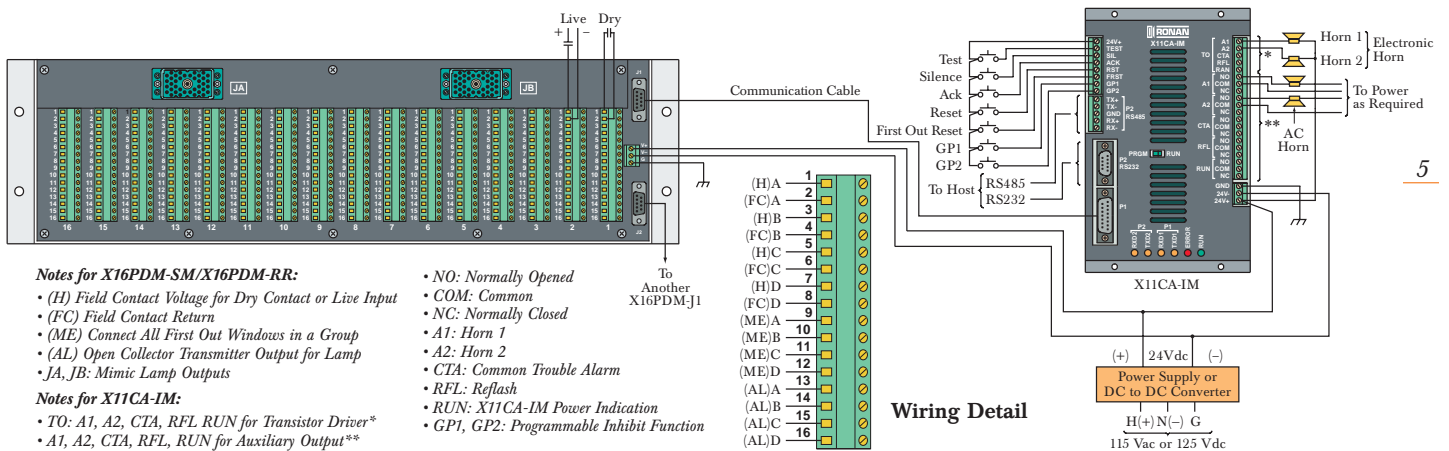
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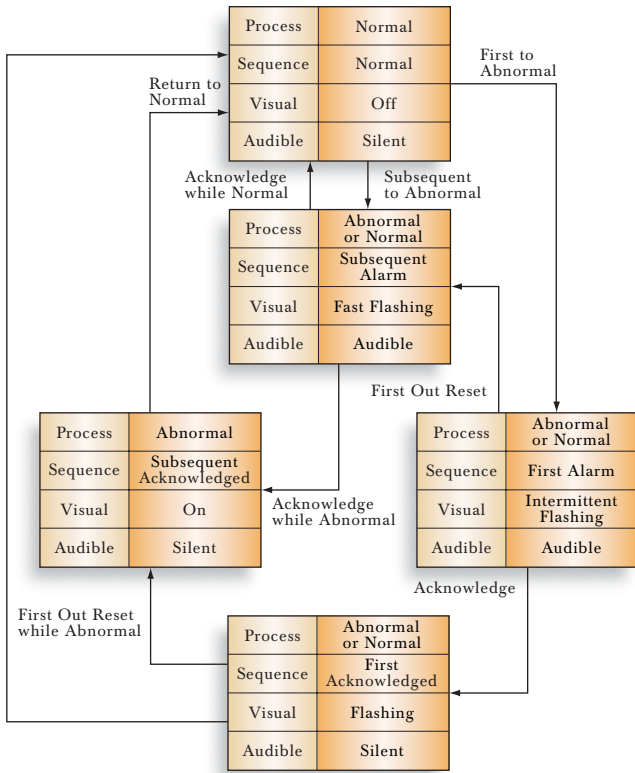


REMOTE ANNUNCIATOR SYSTEMS



MODEL X16PDM-RR WIRING



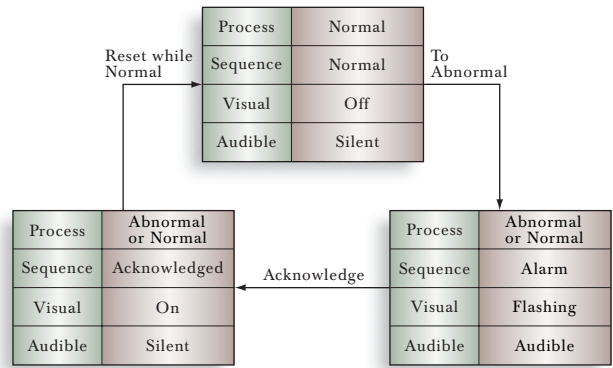


SEQUENCE F3A

Automatic Reset First Out Reset with First Out Flashing and Reset Push Button

- Acknowledge First Out Reset and Test Push Buttons
 - Alarm Audible Device
- Lock-in of Momentary Alarms until Acknowledged
- First Out Flashing Different from Subsequent Flashing
- First Out Reset Push Button to Change the First Out Visual Indication to be the Same as Subsequent Visual Indications
- Automatic Reset of Acknowledged Alarm Indications when Process Conditions Return to Normal
 - Operational Test

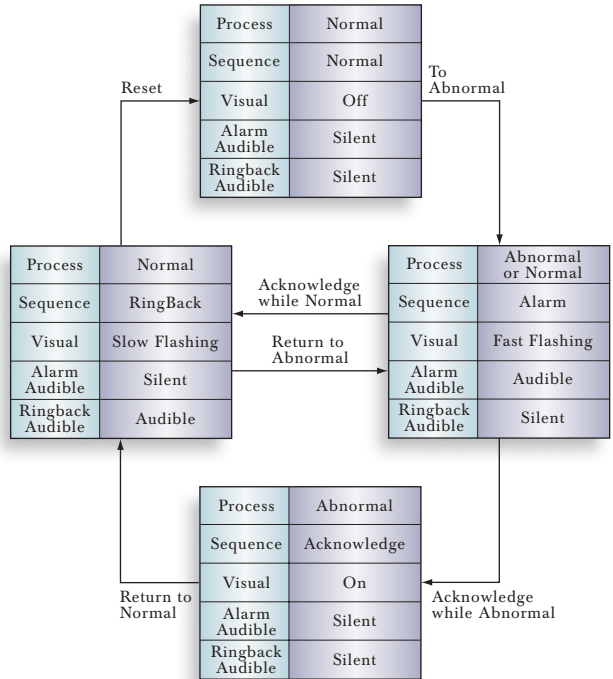
Basic Sequence Letter	Key Words	Option Number	Key Words
A	Automatic Reset	1	Silence Push Button
M	Manual Reset	2	Silence Interlock
R	Ringback	3	First Out Reset Interlock
		4	No Lock-in
		5	No Flashing
		6	No Audible
		7	Automatic Alarm Silence
		8	Common Ringback Audible
		9	Automatic Ringback Silence
First Out Designation	Key Words	Option Number	Key Words
F1	No Subsequent Alarm State	10	No Ringback Audible
F2	No Subsequent Alarm Flashing	11	Common Ringback Visual
F3	First Out Flashing and Reset Push Button	12	Automatic Momentary Ringback
		13	Dim Lamp Monitor
		14	Lamp Test



SEQUENCE M

Manual Reset

- Acknowledge, Reset and Test Push Buttons
 - Alarm Audible Device
- Lock-in Momentary Alarms Until Acknowledged
- The Audible Device is Silenced and Flashing Stops when Acknowledged
- Manual Reset of Acknowledged Alarm Indications after Process Conditions Return to Normal
 - Operational Test

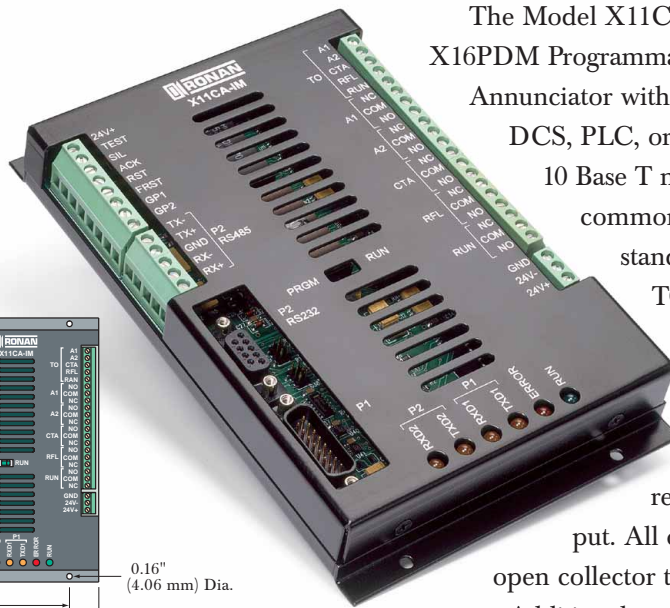


SEQUENCE R

Ringback

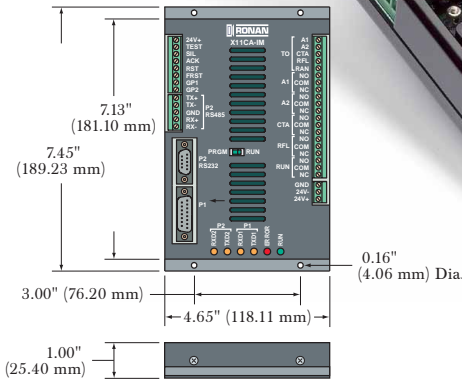
- Acknowledge, Reset and Test Push Buttons
 - Alarm and Ringback Audible Devices
- Lock-in of Momentary Alarms until Acknowledged
- The Audible Device is Silenced and Fast Flashing Stops when Acknowledged
- Ringback Visual and Audible Indications when Process Conditions Return to Normal
 - Manual Reset of Ringback Indications
 - Operational Test

HOST INTERFACE MODULE



The Model X11CA-IM Interface Module connects the X16PDM Programmable Digital Monitor Remote Logic Annunciator with external host devices. Hosts can be a DCS, PLC, or plant computer. An isolated RS485 or a 10 Base T network connection is used with the most common industry accepted communication standards such as MODBUS, DF1, and TCP/IP protocols for host communication.

The Module provides a number of special features such as time-stamped event archive, common trouble alarm, dual horn output, refresh output, and system diagnostic output. All outputs are provided in the form of an open collector transistor and selectable Form C dry contact. Additional on-board LEDs are designed to indicate serial communication and system status.



ALARM SEQUENCE/DISPLAY MODULE

The Ronan Model X16PDM is designed with all sequences available internal to each module, allowing for field programmable selections of all commonly used ISA sequences through a computer or laptop using simple graphical user interface entry. Selection of field contact polarity is allowed through the on board jumpers for each channel. Each alarm/display combination module contains a single, dual, triple, or quad alarm channel with its associated dual lamp or LED displays. The modules are removable from the front without interfering with the remaining modules.



AUXILIARY CONTACT MODULE

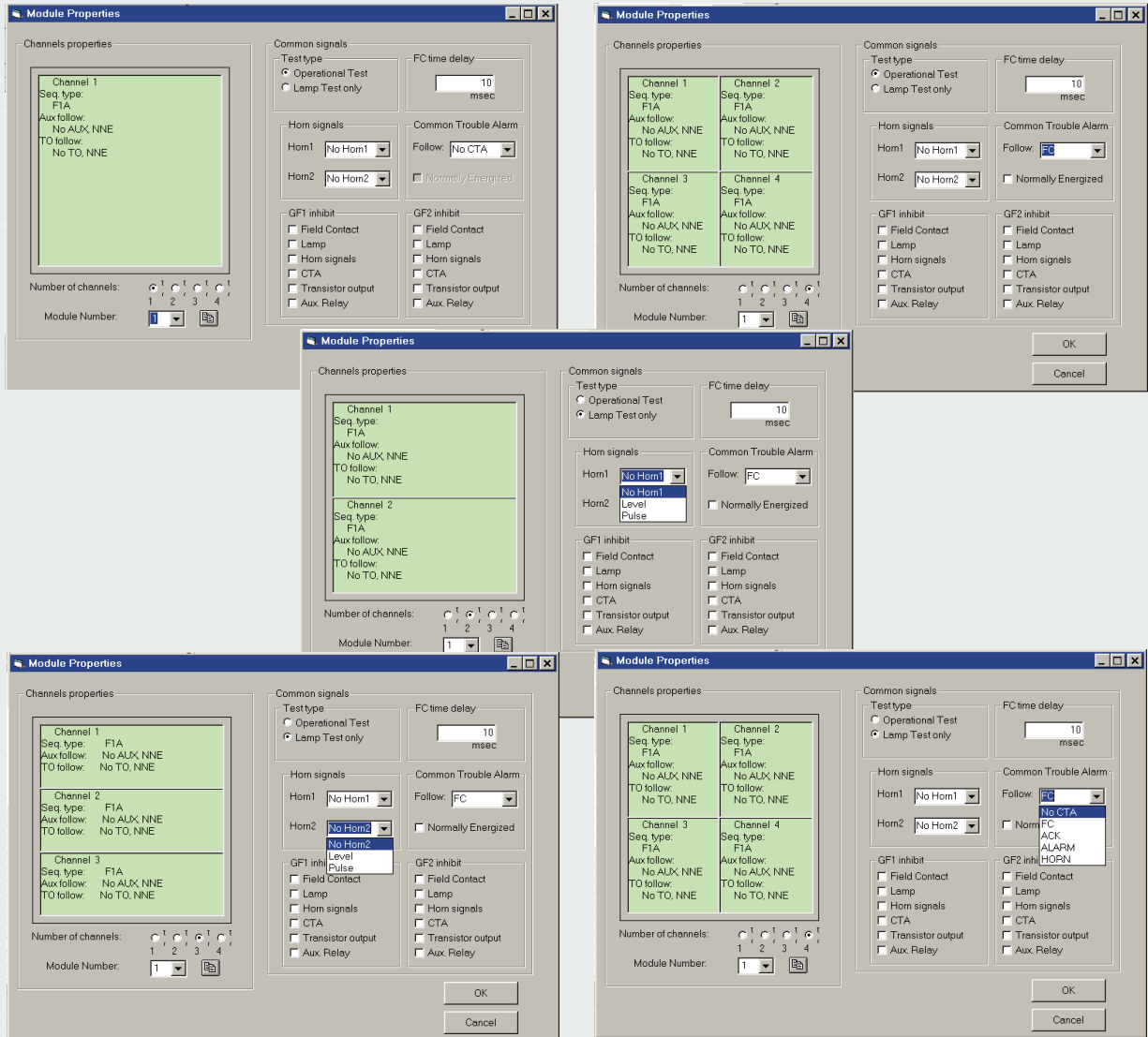


The Auxiliary Contact Module is available for the X16PDM Annunciator with single, dual, triple, or quad relay circuit, according to the density selection. The modules plug in from the front of the system. Each relay provides for a form A or B type contact, normally open or normally closed, and normally energized or normally not energized, and is selectable by a jumper switch.

The Ronan X16PDM Programmable Digital Monitors are configured fully with the use of a Windows graphical user interface application operating in a Windows environment on a PC or Laptop through an RS232 serial connection to the X11CA-IM interface module.

The application allows for factory or field programmability of all features for each window. Configuration data is saved in non-volatile memory on-board each module.

Selections such as alarm sequence, first out grouping, operational or lamp test, output signals follow alarm or field contact, time delay and special functions are all set through the configuration application software.



GRAPHIC MONITORING APPLICATION SOFTWARE

Ronan X16PDM easily interfaces with all common industry display software such as Wonderware®, RS View®, Intellusions®, etc. Ronan provides the X16PDM System with HMI/MMI software and hardware for all monitoring requirements of state-of-the-art installations.

Ronan provides OPC configuration software of graphics and object tagging, all based on process or plant requirement. The system easily adapts to a graphics CRT based annunciator for special annunciator applications.

Computer Hardware Options:

- Standard PCs
- Hardened Industrial PCs
- Dust and Moisture Proof
- Touch Screen Systems



Flow Trends

FLOW1	FLOW2
55.00	54.78
55.00	54.10

Process Parameters

RELIEF %	23.56
PRESS	150.45
STEAM	74.30
TEMP	83.36
TAR	65.30

Water Temp

200
100
0.0

Alarm Management

HIGH HIGH LEVEL	LEAK DETECTED	LOW LOW LEVEL
HIGH LEVEL	LEAK TEST INCONCL	LOW LEVEL
HIGH WATER	THEFT	PROBE FAILURE

Event History

ACK	RECALL	HISTORY
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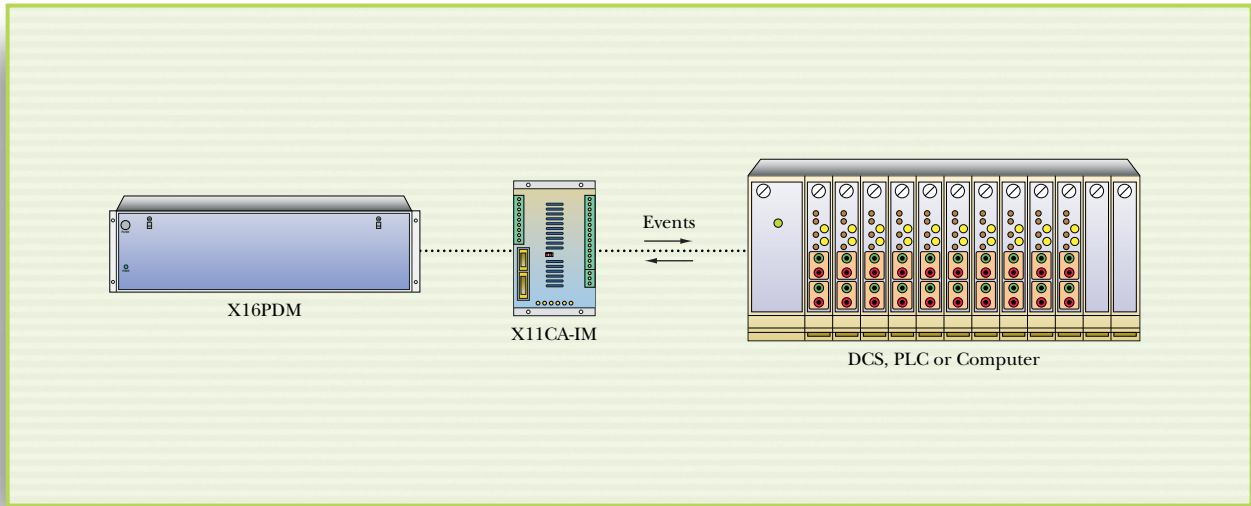
Typical Graphical User Interfaces

Wonderware is a trademark of Invensys Systems, Inc.
 RS View is a trademark of Rockville Automation
 Intellusions is a trademark of Emerson

The Ronan X16PDM Programmable Digital Monitors have comprehensive serial alarm communication facilities to interface to Host machines and transfer field input status to, or receive alarm data from PLCs, DCSs, Network Alarm Servers and Computers.

MODBUS RTU SLAVE

The MODBUS RTU Slave protocol allows users of PLCs and DCSs that are operating as MODBUS Masters to periodically acquire the status of annunciator inputs or transmit alarms to the annunciator for process monitoring. Status of the annunciator is continuously updated in a pre-defined Memory Register Map complying to the MODBUS protocol. The Host (MODBUS Master) periodically reads or writes to the Memory Register Map serially using pre-defined MODBUS command sets. The data is then used for process monitoring.



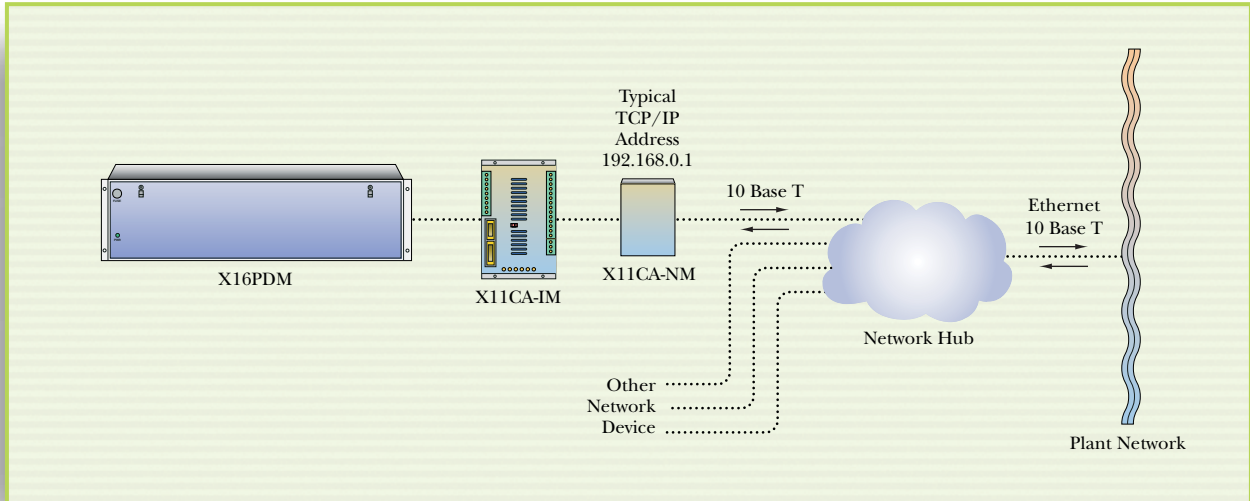
ALLEN BRADLEY DF1 INTERFACE

The Allen Bradley DF1 protocol allows users of AB PLCs to periodically acquire or transmit alarm data to or from the annunciator for monitoring and control. The input status is periodically transmitted as a bitmap complying to the DF1 protocol. The PLC provides an open serial port to send or receive the bitmap status.

NETWORK TCP/IP

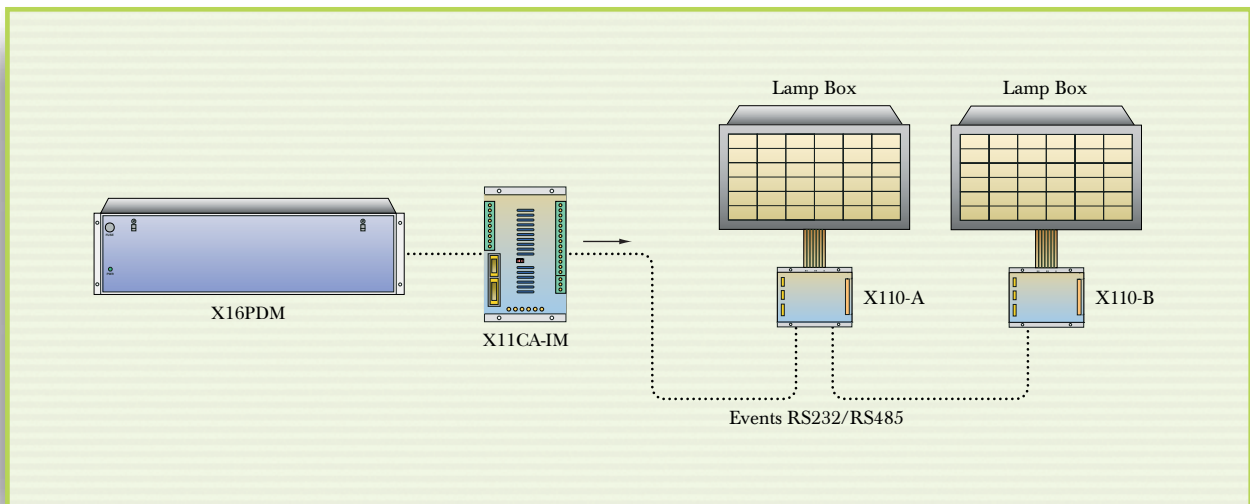
Transport Control Protocol/Internet Protocol (TCP/IP)

The Ronan X16PDM provides as an optional connection using the X11CA-IM interface module and X11CA-NM network converter module to a local or plant network. The input alarm status is transmitted or received via TCP/IP at speeds of up to 10 MB all across the network.



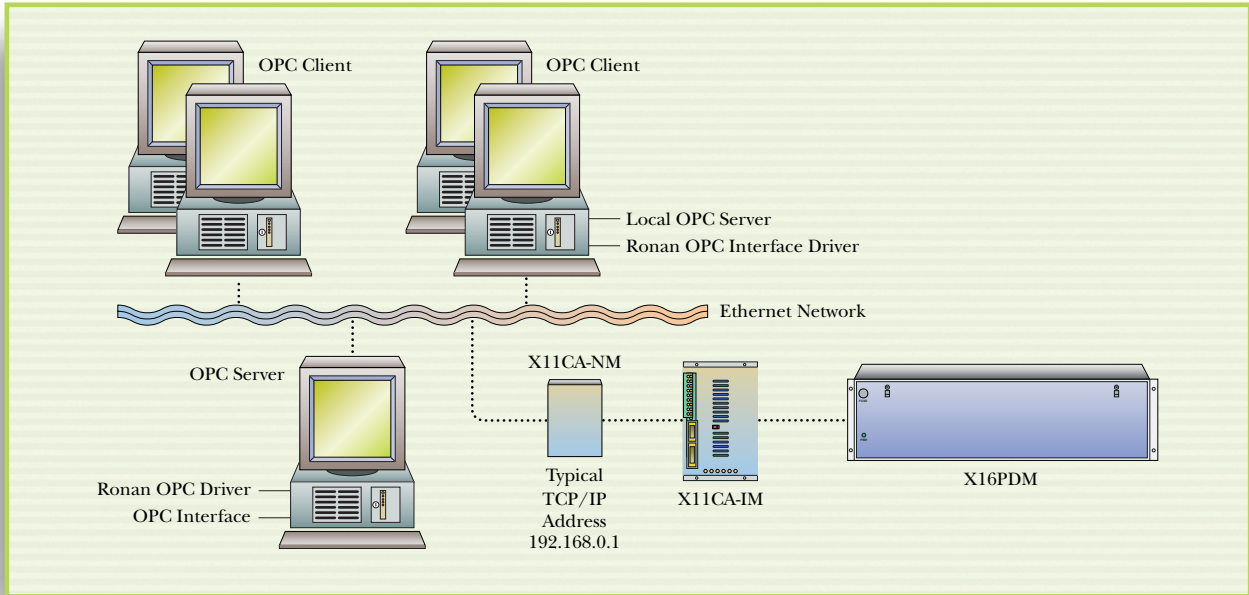
RONAN PROPRIETARY (Alarm/Normal)

The X16PDM provides features to serially transmit input alarm status to external host devices through X11CA-IM. This feature can be used to transfer input alarm status serially to Ronan's X110 Serial Annunciator for remote visual annunciation display.



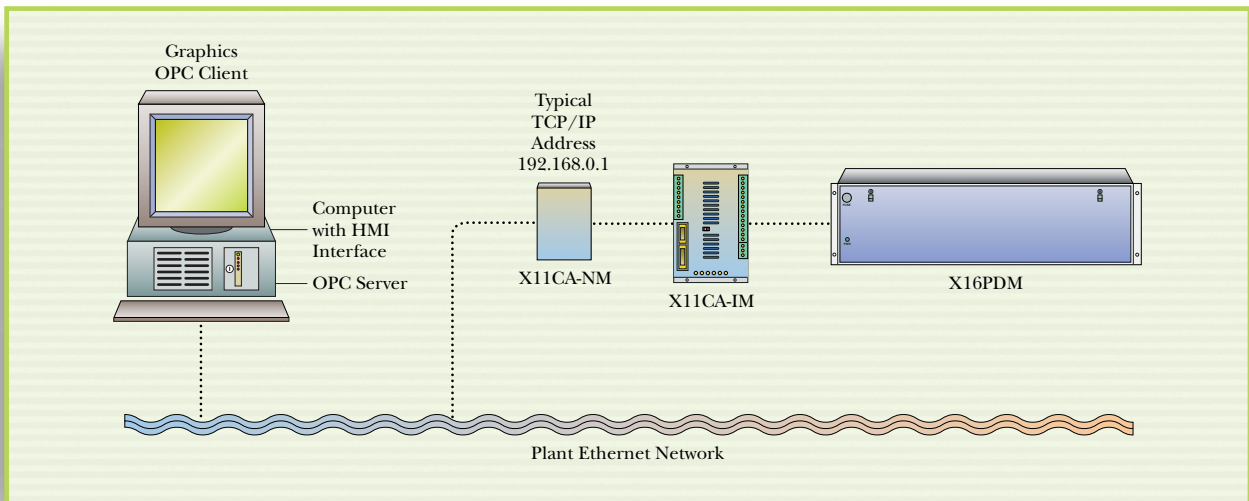
OPC INTERFACE (Object Link Embedded for Process Control)

OPC is designed to allow client applications access to alarm input status of a system in a consistent manner. With wide industry acceptance, OPC provides easy integration into the common Human Machine Interface (HMI) applications widely used in the process industry.



TYPICAL APPLICATION

The X16PDMs feature an optional 32 bit Windows NT driver and mechanisms for OPC clients to be notified of the occurrences of specified events and alarm conditions. They also provide services which allow OPC clients to determine the events and conditions supported by an OPC server, and to obtain their current status.



System Voltage:

- Lamps, Logic – 24 Vdc ± 20%
- Field Contacts – 24 Vdc, 48 Vdc, 125 Vdc, 115 Vac, or 240 Vac

Power Source (System External):

- Power Supply – 115 Vac 50/60 Hz; 240 Vac 50/60 Hz
- Converter – 24 Vdc, 48 Vdc, or 125 Vdc

Temperature Range:

- Operating – 0° to 60° C (32° to 140° F)
- Storage – -40° to +85° C (-40° to +185° F)

Inputs:

- Contact – Dry or Live; Normally Open / Normally Closed
- Field Selectable
- Interrogation Voltage – 24 Vdc, 48 Vdc, 125 Vdc, 115 Vac, or 240 Vac

Response Time: 10 Milliseconds

EMI/RFI Capability: CE Compliant

Outputs:

- Visual – Fast Flash, Slow Flash, Steady ON, Intermittent Fast Flash
- Audible – Dual, Selectable by Cabinet Module
- Auxiliary Relays – Form C, Selectable Form A or B; Normally Not Energized or Normally Energized
- Contact Rating – General Purpose: 2 Amps @ 28 Vdc; 0.65 Amp @ 115 Vac
- Common System Trouble: Form C, 2 Amps @ 28 Vdc; 0.65 Amp @ 115 Vac – Open Collector Transistor Output 200 mA @ 28 Vdc
- Common System Reflash: Form C, 2 Amps @ 28 Vdc; 0.65 Amp @ 115 Vac – Open Collector Transistor Output 200 mA @ 28 Vdc

Controls:

- Momentary Push Button: Integral or Remote; Single Pole
- Normally Open; +V Switched; Silence; Acknowledge;
- Reset, Test, GP1, GP2

Diagnostic:

- System Trouble Alarm (RUN) - Form C, 2 Amps @ 28 Vdc; 0.65 Amp @ 115 Vac
- System Trouble Alarm (RUN) - Indicating LED Green
- Communication Diagnostic (ERROR) - Indicating LED Red
- Transmit/Receiver LED Pair

Communications:

- Serial - RS485 (P1) to External Host
- Network - RJ45 (TCP/IP) to External Host

Serial Protocols:

- MODBUS RTU, Allen Bradley, DF1, DNP 3.0, Ronan Proprietary

Network Protocols: TCP/IP (OPC)

Serial:

- RS232 (P2) - System Sequence and Option Programming via Laptop or Computer
- Software - Ronan X11CA Configuration

Special Feature:

- Alarm Time Stamping
- Alarm Storage - 500 Alarms
- GP1, GP2 - Special Function Push-button Interface

To specify the correct power supply, count the number of alarm modules you need to power from the supply. Calculate the total requirement as follows:

Total Watts = No. of Modules × F(Factor + F Aux.) + P(IM)

Model	F Module	F Aux. Relay Adder	P(IM)
X11PDM	3W	4W	10W

Match the total wattage with the next higher power rating of the Power Supply or Converter listed.

DC/DC Converters	AC/DC Power Supplies
<i>Model - Power Failure, Circuit Breaker, Power ON Light, Diode Gated</i>	115 - 24 - 125
	115 - 24 - 250
	115 - 24 - 375
125 - 24/125 - 150 SCP	116 - 24 - 500
125 - 24/125 - 300 SCP	115 - 24 - 750
125 - 24/125 - 600 SCP	220 - 24 - 125
48 - 24/125 - 150 SCP	220 - 24 - 250
48 - 24/125 - 300 SCP	220 - 24 - 375
48 - 24/125 - 600 SCP	220 - 24 - 500
	220 - 24 - 750
	115 - 24/125 - 125
	115 - 24/125 - 250
	115 - 24/125 - 375
	115 - 24/125 - 500
	115 - 24/125 - 750
	115 - 24 - 250DA
	115 - 24 - 375DA
	115 - 24 - 500DA
	115 - 24 - 750DA

Power Output Watts

DC Voltage Out

DC Voltage In

AC Voltage In

DC Voltage Out

Power Output Watts

Diode Grated Output



X16PDM PROGRAMMABLE DIGITAL MONITORS

Logic Chassis (Rack-mount/Surface-mount)

X16PDM-RR-16-T	16 Module (84 Points Maximum without Auxiliary Contacts/32 Points with Auxiliary Contacts), Terminals Only
X16PDM-RR-16-TE	16 Module (64 Points Maximum without Auxiliary/32 Points with Auxiliary Contacts), Elco Connector for Lamp Driver
X16PDM-SM-8-T8	Module (32 Points without Auxiliary Contacts/16 Points with Auxiliary Contacts), Terminals Only
X16PDM-SM-8-TE8	Module (32 Points without Auxiliary Contacts/16 Points with Auxiliary Contacts), Elco Connector for Lamp Driver
X16PDM-SM-16-T16	Module (64 Points without Auxiliary Contacts/32 Points with Auxiliary Contacts), Terminals Only
X16PDM-SM-16-TE16	Module (64 Points without Auxiliary Contacts/32 Points with Auxiliary Contacts), Elco Connector for Lamp Driver

Notes: 1. Each X16PDM Chassis will require an X11CA-IM Interface Module. 2. X16PDM-RR Rack-mount Chassis available in 16 modules only. 3. For every Auxiliary Module an associated Alarm Module is required. 4. For Auxiliary Module selection, refer to X11CA Literature. Use Quadalarm Aux. only. 5. For Lamp Cabinet selection refer to Ronan Lamp Cabinet Literature. 6. For Communication Cables refer to table below.

Alarm Modules

A. Sequence Type: (Other sequences available)

- M = ISA M-1
- F3 = ISA F3A-1
- ASL = ISA A-4, 5, 6

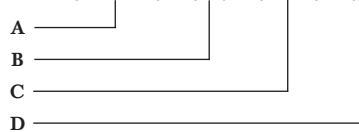
B. Field Contact Voltage:

- 0 = 24 Vdc, Not Opto-isolated
- 1 = 115 Vdc, Not Opto-isolated
- 2 = 48 Vdc, Not Opto-isolated
- 3 = 115 Vac or 125 Vdc, Opto-isolated
- 4 = 240 Vac or 250 Vdc, Opto-isolated
- 5 = 250 Vdc, Not Opto-isolated
- 6 = 24 Vac or 24 Vdc, Opto-isolated
- 7 = 24 Vdc, Open Collector
- 8 = 48 Vac or 48 Vdc, Opto-isolated

C. Special Options and CTA:**

- 00 = Operational Test, NNE CTA follows FC
- 04 = Operational Test, NNE CTA follows Alarm
- 09 = Lamp Test, NO CTA, Lamp Inhibit Input on F4, Dual Horn Selectable
- 10 = Lamp Test, NNE CTA follows FC
- 11 = Lamp Test, NNE CTA follows FC, Lamp Inhibit on F4, Dual Horn Selectable
- 12 = Operational Test, NNE CTA follows FC, Lamp Inhibit Input on F4, Dual Horn Selectable
- 13 = Option 09 and Four Point Lamp Holder on Non-4000 System
- 16 = Lamp and Operational Test PB, NNE CTA follows FC, First Out Reset and Reset PB

X16PDM - () - () - () - ()



- 17 = Operational Test, NNE CTA follows FC, Dual Horn Selectable
- 18 = Operational Test, NNE CTA follows FC
- 19 = Operational Test, NNE CTA follows FC, FC Time Delay
- 20 = Lamp Test, NNE CTA follows FC, FC Time Delay
- 21 = Operational Test, NNE CTA follows FC, FC Time Delay, Lamp Inhibit Input on F4, Dual Horn Selectable
- 22 = Lamp Test, NNE CTA follows FC, FC Time Delay, Lamp Inhibit on F4, Dual Horn Selectable
- 23 = Operational Test, NNE CTA follows FC, Lamp Mimic Output on TOA-TOD

D. Auxiliary Relay Behavior:

- 1 = NE Aux follows FC
- 2 = NNE Aux follows FC
- 3 = NE Aux follows Alarm
- 4 = NNE Aux follows Alarm
- 5 = NE Aux follows Acknowledge
- 6 = NNE Aux follows Acknowledge
- 7 = NE Dual Aux follows FC
- 8 = NNE Dual Aux follows FC

Auxiliary Contact Modules

Notes: Modules contain relays only. Universal Chassis allow addition of Auxiliary Contact Modules in the field. Surface-mount Chassis provide 1 amp @ 24 Vdc.

X11CA - () - AUX - ()

- 1 = Monalarm
- 2 = Dualalarm
- 3 = Trialarm
- 4 = Quadalarm

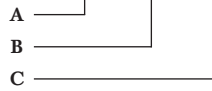
Relay Type:

- GP = General Purpose Relay, 1 Amp @ 24 Vdc, 0.50 Amp @ 115 Vac
- HS = Hermetically Sealed Relay, 1 Amp @ 24 Vdc, 0.50 Amp @ 115 Vac

INTERFACE MODULES / COMMUNICATION

Interface Modules

X11CA-IM - () - () - ()



A. Voltage

0 = 24 Vdc

B. Communication Protocol

- 1 = Serial MODBUS RTU Slave
- 2 = Serial Allen Bradley (DFI Protocol)
- 3 = Serial Ronan Proprietary (X110)
- 4 = Network TCP/IP (Requires X11CA-NM, X11CA-SC-4 and X11CA-SC-5)
- 5 = Network TCP/IP (OLE for Process Control OPC) (Requires X11CA-NM, X11CA-SC-4 and X11CA-SC-5)
- 6 = Consult Factory for Special Protocols

C. Physical Communication Layer to Host

- 1 = RS232
- 2 = RS485
- 3 = Network 802.11 (RJ45)

X11CA-NM: RS232 to TCP/IP Network Converter Module



COMMUNICATION CABLES

- X16PDM-LC - 1 - () - ()** X16PDM Logic to Lamp Cabinet, 38 Conductor, with Elco Connectors at Each End, 10.00 Feet (3.05 Meters)
- X16PDM-LC - 2 - () - ()** X16PDM Logic to Lamp Cabinet with Elco Connector on X16 Side, Stripped Ends on Lamp Cabinet, 10.00 Feet (3.05 Meters)
- X16PDM-LC - 3 - () - ()** X16PDM Logic to Field Termination with Elco Connectors at Each End, 10.00 Feet (3.05 Meters)
- X16PDM-LC - 4 - () - ()** X16PDM Logic to Field Termination with Elco Connector at Logic, Stripped Conductor at Terminals, 10.00 Feet (3.05 Meters)
- X16PDM-LC - 5 - () - ()** X16PDM Programmable Digital Monitor to X11CA-IM
- X16PDM-LC - 6 - () - ()** X11CA-IM to Host RS232, 25.00 Feet (7.62 Meters)
- X16PDM-LC - 7 - () - ()** X11CA-IM to Host RS485, 25.00 Feet (7.62 Meters)
- X16PDM-LC - 8 - () - ()** X11CA-IM to X11CA-NM, 6.00 Feet (1.83 Meters)
- X16PDM-LC - 9 - () - ()** X11CA-NM to Host (Category 5), 25.00 Feet (7.62 Meters)
- X16PDM-LC - 10 - () - ()** X16PDM Programmable Digital Monitor to X16PDM, 25.00 Feet (7.62 Meters)
- X16PDM-LC - 11 - () - ()** Cable Assembly, X11CA-IM to Computer/Laptop, 6.00 Feet (1.83 Meters) Standard Length (For Programming and Configuration)

Length (Feet)

Cable Type: 0 = PVC
1 = XPLE



W A R R A N T Y

Ronan warrants equipment of its own manufacture to be free from defects in material and workmanship, under normal conditions of use and service, and will repair or replace any component found to be defective, on its return, transportation charges prepaid, within one (1) year of its original purchase.

This warranty carries no liability, either expressed or implied, beyond our obligations to replace the unit which carries the warranty.



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