

Serial Communications Visual Annunciator Systems

MODEL X110



The Ronan X110 Serial Input Annunciator is designed to accept contact status changes from a host via a standard serial communication line for display similar to a conventional window annunciator. The host, typically a Ronan field multiplexer, sequence of events recorder, PLC or computer, generates the contact status data to be sent from one of its standard communication ports, by hard-wire or fiber-optics connection, to the X110 Controller. Each X110 Controller accepts up to 240 inputs, programmable for single or multiple inputs to any one of the 48 outputs connected to individual windows or indicators of a process graphic. For

applications requiring more than 48 outputs, additional X110 controllers may be daisy-chain connected for up to 1536 outputs.

The X110 Systems' architecture provides for short connection between field contacts and the host multiplexer with a single communication

SERIAL COMMUNICATIONS

VISUAL ANNUNCIATORS

cable to the display site, giving the user exceptional cost savings on cabling, installation, and set-up time. The on-line custom configurability allows programming of any one input, or a number of inputs, to any one of the 48 windows serviced by the associated controller.

The X110 Systems, designed for high density and limited space application, feature total flexibility in the selection of window size or type of indicators. With the controller(s) mounted integral or remote to the lamp cabinet or graphic, they are ideally suited for limited space and reduced panel depth, unlike a conventional annunciator.

FEATURES

The Model X110 Serial Input Controller provides up to 48 short-circuit-proof output drivers which are controlled by the sequence processor and will support up to 16 standard ISA 1.8 alarm sequences as well as the on/off functions. A second processor handles all communication tasks and program functions. The dual processor unit and its EEPROM allows storage of alarm sequence and input assignment for each window, including multiple input to a single window for reflash. The unit contains the programming menu, a watchdog timer relay for self monitoring and alarm/ring back, or high/low priority horn interface relays. A number of jumpers will allow the selection of ASCII communication parameters and proper termination of transmission lines.

APPLICATIONS

The Model X110 Serial Input Controller finds numerous applications for control functions such as field contact repeater, relay drivers for shutdown and control applications lamp drivers of multi-window alarm annunciator lamp cabinets, or indicators in process graphics. The controller may be mounted integral to the displays, or located remote and connected via multi-conductor cables and multi-pin connectors on both the controller and the display side.

SYSTEM CONFIGURATION

The X110 Serial Input Controller is typically a component of a display system consisting of the host, a single or multiple controller(s), a window array or process graphic, power supplies, communications cables, pushbuttons, and audible devices. For a system requiring more than one 48 output controller, the units are in multi-drop configuration connected, up to 32 units before additional line drivers are required. Communications between controllers in the chain are via RS485. Pushbuttons, audible function and power supplies may service each individual controller or a group of controllers.

COMMUNICATION PROTOCOL

The Model X110 Controller Module communicates with its data source via full duplex ASCII, RS232-C, RS422/485, or current loop at selective baud rates from 1200 to 9600 baud, depending on distance and compatibility. The standard ASCII data frame format is selective 7 to 8 bits with odd or even parity. The protocol is typically passive listeners, STX/ETX, XON/XOFF. Optionally, error checking is available in either BCC (Block Check Character) or CRC (Cyclic Redundancy Character). For applications where the host is a PLC or DCS system, block transfer protocols such as Allen Bradley or ModBus++ are utilized. These protocols allow high speed data transfer via a binary file, representing the status of a large number of contact inputs to the multiplexers of the host.



X120



X500E



PLC



DCS/PC

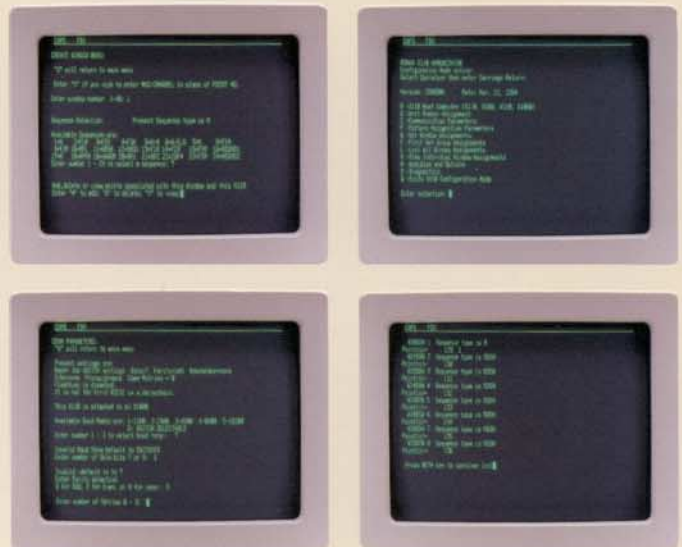
HOSTS

X120 Field Multiplexers — The Ronan X120 Multiplexer accepts up to 48 digital inputs and can be grouped to monitor up to 1,536 input contacts. Status changes are sent to the X110 Serial Input Annunciator Controller via current loop, RS422 or RS232 connection and standard ASCII character or Binary Bitmap Protocol.

X500E Sequence of Events Recorders — The Ronan X500E High Speed Data Acquisition System, designed for 1 ms resolution provides information to the X110 Serial Input Controllers for visual plant status annunciation. Single or redundant train system architecture is available.

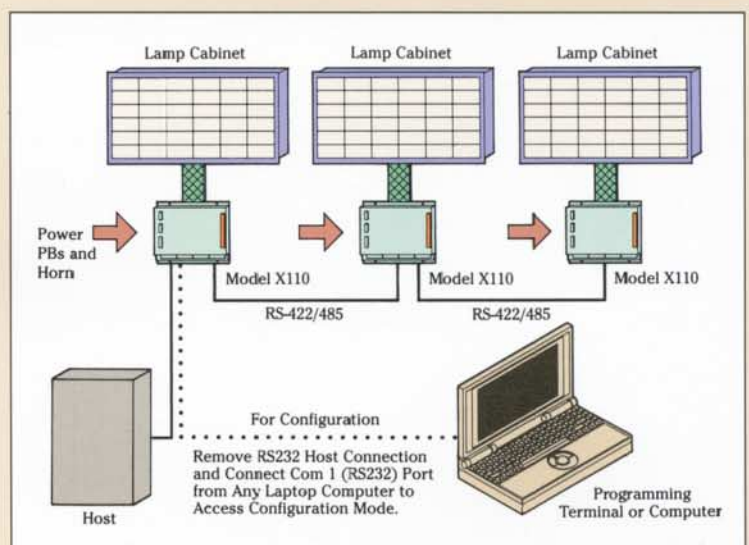
Programmable Logic Controllers (PLC) — The limited resources of PLCs make the X110 an ideal method of displaying plant and process status. The X110 Controller's programmable sequences and visual display drivers provide cost savings over PLC I/O and logic programming. Use one serial I/O port from the PLC HOST to drive lamp cabinets or graphics displays.

Digital Control Systems (DCS)/PC Computers — One serial port from these hosts provides a conventional display capability to augment the CRT video. Paging through numerous video screens for status review is minimized, and key plant or process conditions can be displayed in the control room or remotely on easy to read conventional annunciator or graphic displays.



PROGRAMMING

The X110 provides menu driven programming capability by connecting a standard CRT video terminal or PC computer to the first X110 in the string. Each X110 is addressed via its unique I.D. number thereby causing a programming menu for the select X110 to be displayed. Keyboard selected programmable parameters include: type of alarm sequence for each alarm window driver, first-out groupings, single or multiple inputs to any window driver, normally open or closed input logic, and a choice of two priority level audible horn drivers. This simple question and answer programming format illuminates each window being programmed and provides a listing of input assignments and parameters. All information is stored in non-volatile EEPROM memory without the need for external battery backup.



SPECIFICATIONS

Input Power: 24 Vdc

Power Requirements: X110 - 12 Watts plus lamps, LED or relay requirements

Display Capacity: 48

Output Driver: 200 mA/output, short-circuit proof

Operating Temperature: 32° to 140°F (0° to 60°C)

Storage Temperature: -40° to 184°F (-40° to 85°C)

Data Transmission/Baud Rates: 1200, 2400, 4800, 9600, 19,200

Input Communication Type (with maximum recommended distance): *Type:* RS232-C (no modem); *Distance:* 50 ft./15 m; *Baud Rate:* All *Type:* RS422/485; *Distance:* 4000 ft./1200 m; *Baud Rate:* All *Type:* Current Loop; *Distance:* 5000 ft./1500 m; *Baud Rate:* 1200

Output Communication Type (with maximum recommended distance): *Type:* RS422/485 (no modem); *Distance:* 4000 ft./1200 m, *Baud Rate:* All

Communication: Full duplex; Data format 7 or 8 bits; 1 or 2 stop bits

Parity: Odd, even, or no parity

Protocol: *Hardware Handshake:* Optional; *Software Handshake (selectable):* STX/ETX, ACK/NAK, ECHO, X ON/OFF, or PASSIVE LISTENER (no handshake)

Error Check: BCC or CRC

Point Identification: 0001-9999

Controller Identification: 001-256

Configuration Data Entry (menu-driven): By standard terminal, personal computer, or "on-line" host

Remote Mounting: *Surface Mount:* Multiconductor cable to display. *Rack Mount:* Plug-in type multiconductor cable to display

Integral Mounting: *Surface Mount:* Wired integral to display. *Plug-in Modules:* Chassis integral to display

Audible: Single or dual horn; High/low priority selectable

Silence: Manual or automatic per ISA-7, 9

3-Output Relays: Alarm horn control; Ringback horn control; Software watchdog controlled run relay

Contact Rating: 2 amps at 24 Vdc; .5 amps at 120 Vac

Program Retention: 10 years minimum (E2PROM)

Alarm Sequence: ISA A, F1A, F2A, F2M, F3A, F3M, M, R, F1R, F2R, F3R, A-4, A-5, 6, ON/OFF

Multiple Input: Reflash capacity up to 240 inputs into 48 windows

Pushbutton: Independent or interlocked per ISA-1, 2, 3, remote mounted, or integral to lamp cabinet

Lamp/Audible: Test pushbutton pressed; Lamps illuminated; Alarm horn on for 2 seconds, then ringback horn on for 2 seconds

Short-Circuit-Proof Output Drivers: For lamps, LED, or relays

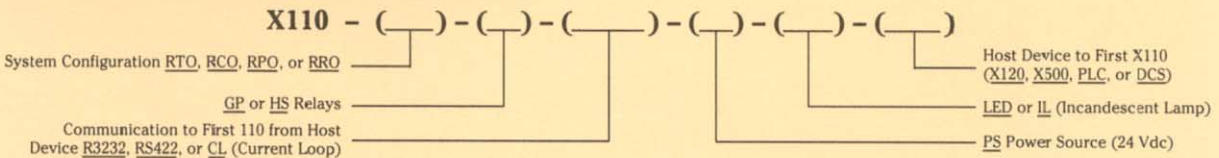
Single Train Configuration: Non-critical applications

Dual Train Configuration: High reliability (critical)

Protection: Each unit is fuse protected. The unit can be completely "write" protected

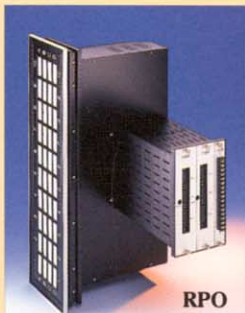
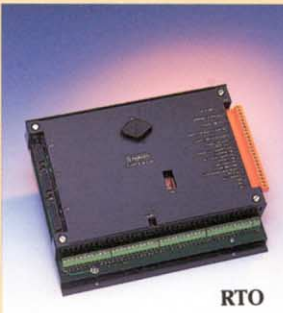
Switch Selection: Termination of communication lines; Master/slave unit; "Write" protected on/off; Input communication line selection CL/RS232; Flash sync.

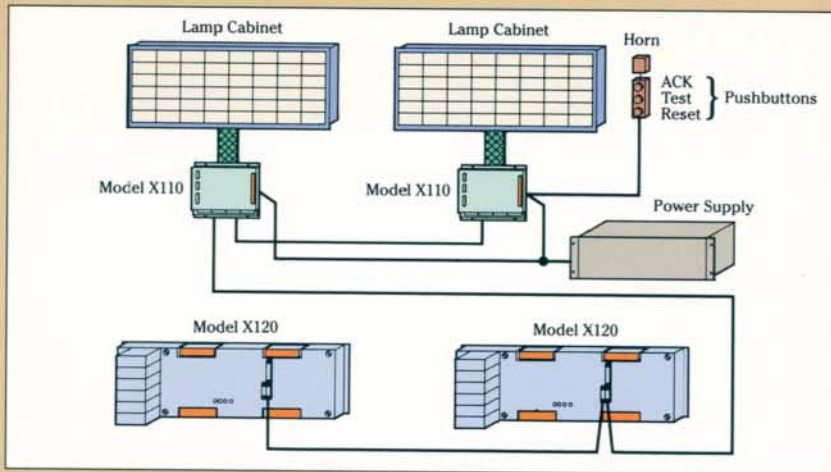
ORDERING INFORMATION



- X110-RTO** – Unit with Terminals for Lamp Driver Outputs. Specify mounting (integral or remote) and the wiring of X110-RTO to lamp cabinet.
- X110-RCO** – Unit with 2 Elco Connectors for Lamp Driver Outputs. For systems with remote X110-RCO, two C3838 lamp driver cables are required for each X110-RCO. Lamp cabinet to be furnished with Elco connectors. Specify cable length.
- X110-RPO** – Plug-In Type to Rear of Lamp Cabinet. RPO requires chassis in rear of lamp cabinet
- X110-RRO** – Plug-In Type to Rack Mount Chassis. Cable connection to lamp cabinet. Two C3838 lamp driver cables required per RRO.
- X110-RR8** – Chassis, relay rack mount, capacity (8) X110-RRO modules
- X110-LBM** – Chassis, mounted in rear of lamp cabinet, capacity (2) X110-RPO

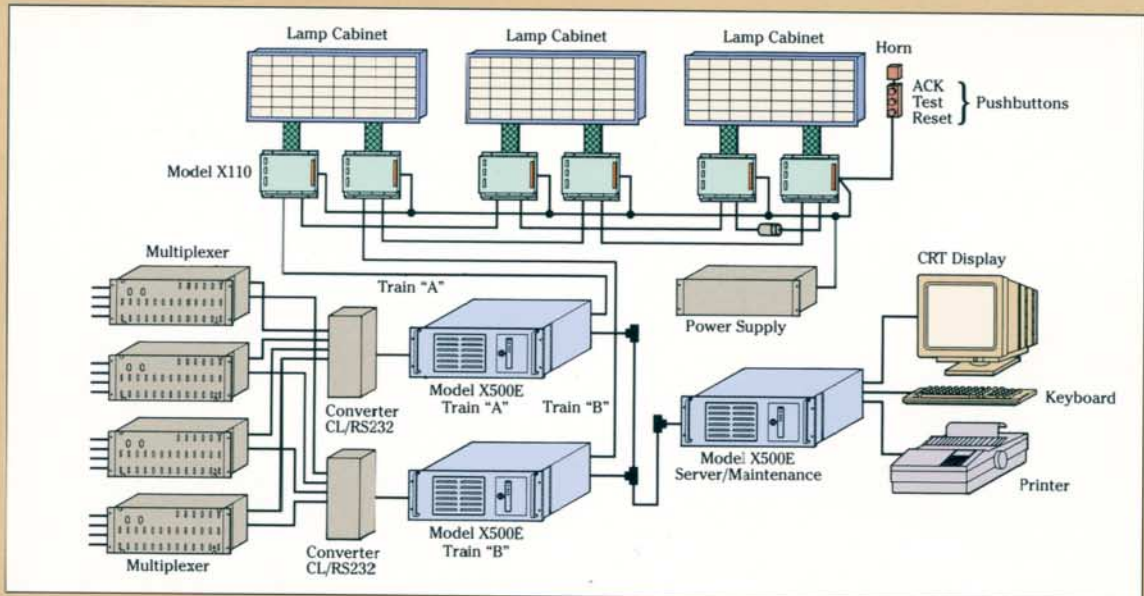
Notes:
 1. X110-200 – (*) ft. Communication cable between the host and the first X110. Customers must provide connector type on host side. (*) Length in feet.
 2. X110-100 – (*) ft. Communication cable X110 to X110 with "D" connector on each end. (*) Length in feet.
 3. External power supply required for X110 and lamp cabinets. System operates on 24 Vdc.





SINGLE TRAIN SYSTEMS

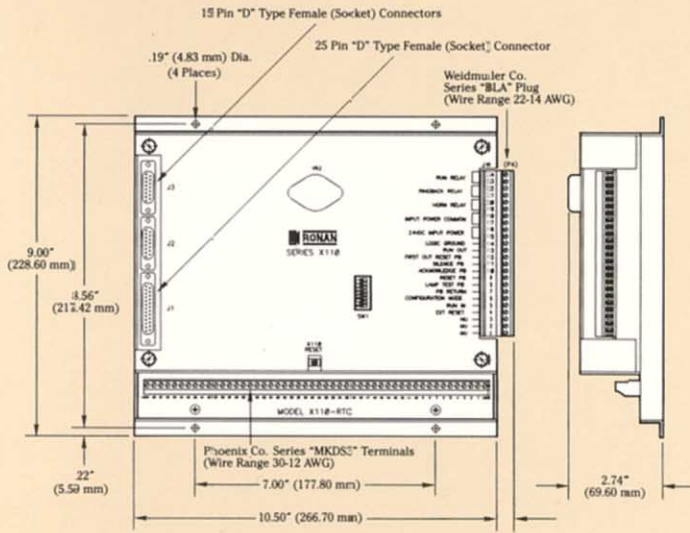
Replacement or substitution of a conventional annunciator system is accomplished with a single train system consisting of the host, typically an X120 Field Multiplexer, connected via standard full duplex current loop or RS422 data cable to an X110 or string of X110s, with their output providing control of the dual bulbs or LED of a lamp cabinet or indicators of a graphic display.



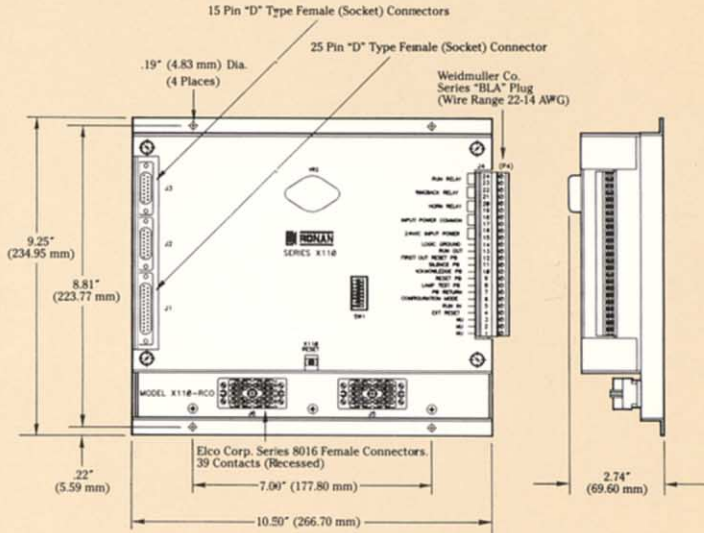
DUAL TRAIN (Redundant) SYSTEMS

For critical applications such as power plants or chemical processes, the user may elect to utilize dual, redundant trains to achieve highest reliability. For this type of systems architecture, all equipment is duplicated to provide two sets of single trains with the field contact as only common device. The dual hosts interrogate the field contact, sending status changes via dual communication cables to the X110(s). The outputs of each train are connected to one of the indicators in each window of the lamp cabinet(s). The loss of a component in one of the two trains will only affect either all the left-hand or right-hand bulbs (LEDs) of the lamp cabinet(s).

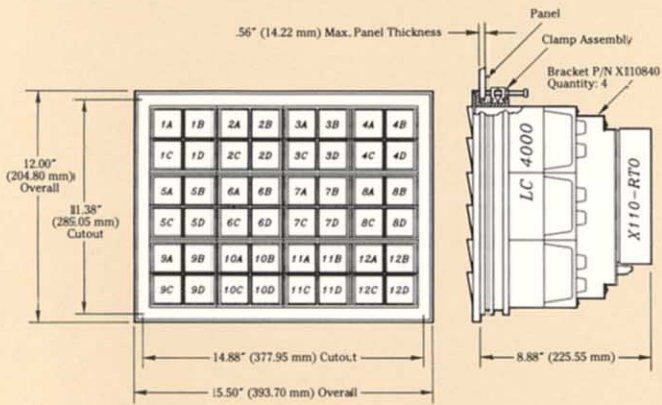
DIMENSIONS



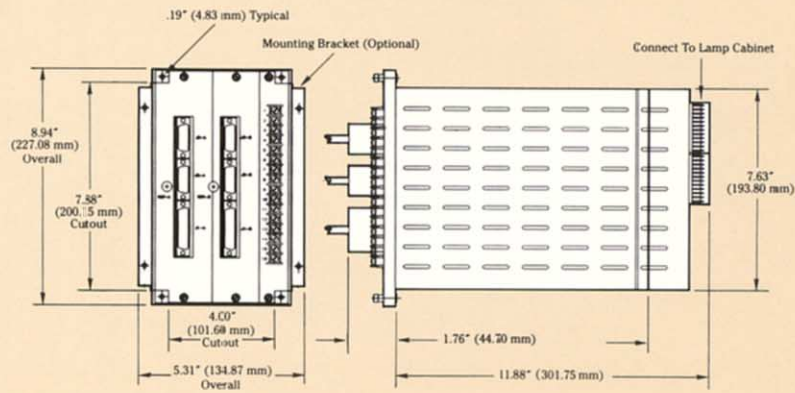
Model X110-RTO Controller Module



Model X110-RCO Controller Module



Model LC-4000 Lamp Cabinet with Integral X110-RTO (Factory Mounted and Wired)



Model X110-LBM Chassis with Redundant RPOs (Typically Mounted and Wired in Lamp Cabinet)

WARRANTY

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 replace any component found to be defective, on its return, transportation charges prepaid, within one 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.



RONAN ENGINEERING COMPANY
 P.O. Box 1275
 21200 Oxnard Street
 Woodland Hills,
 California 91367 U.S.A.
 (818) 883-5211 • (800) 327-6626
 FAX (818) 992-6435

RONAN ENGINEERING LTD. U.K.
 1 Tilley Road
 Crowther Industrial Estate
 Washington, Tyne and Wear
 United Kingdom, NE38-0EA
 (191) 416-1689
 FAX (191) 416-5836

RONAN ENGINEERING LIMITED
 32 Bermondsey Road
 Toronto, Ontario
 Canada M4B1Z5
 (416) 752-0310
 FAX (416) 752-8072

RONAN ENGINEERING (AUST.) PTY. LTD.
 Unit 10, 8 Leighton Place
 Hornsby, N.S.W. 2077
 Australia
 (02) 477-7344
 FAX (02) 477-6151