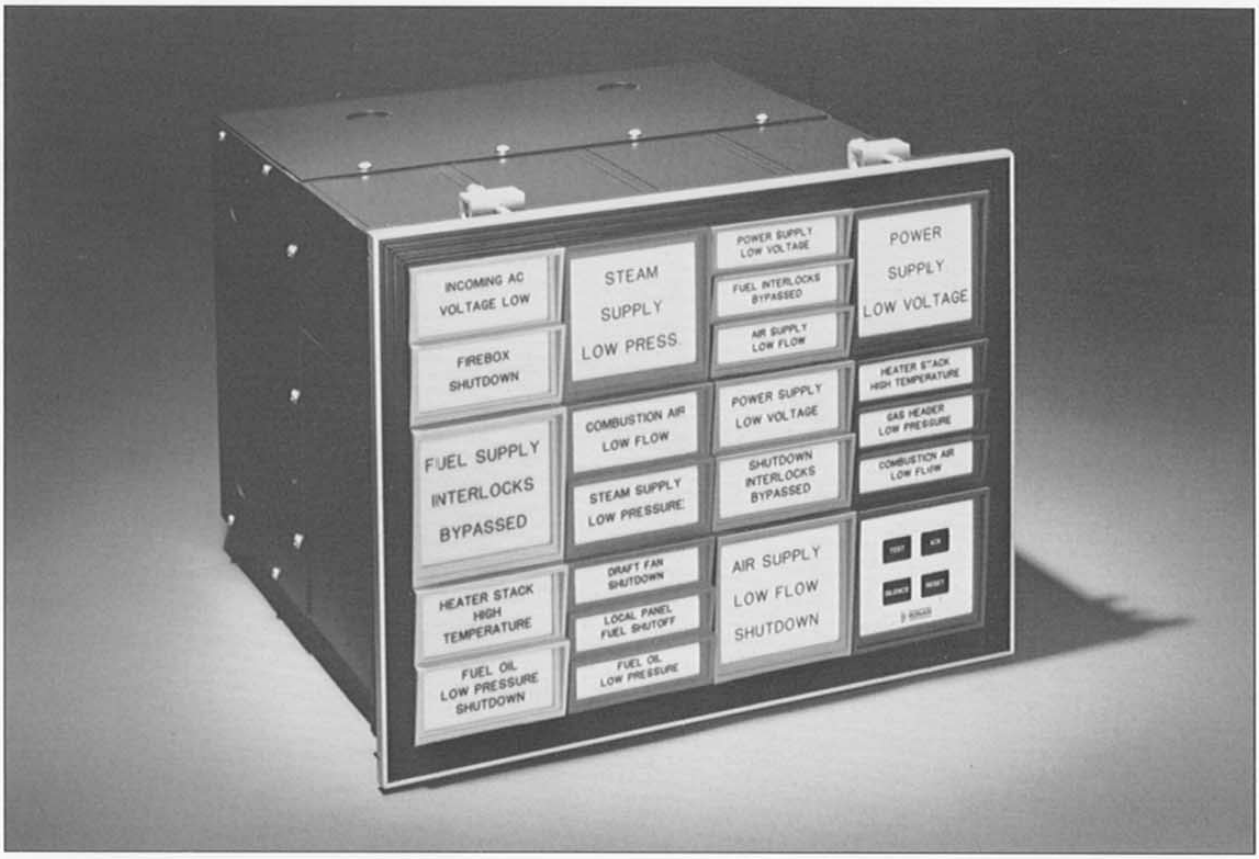
Instructions
and
Operating Manual

SERIES X11

ANNUNCIATOR SYSTEMS



RONAN

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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 repair or 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 obligation to replace the unit which carries the warranty.

1.0 GENERAL DESCRIPTION

The Ronan Series X11 Annunciator Systems feature Monalarm, Binalarm and Trialarm displays within Ronan's standard 3.5 inch (89 mm) by 3.5 inch (89 mm) mechanical cabinet modules. The single plug-in module construction contains single or multi-point alarm circuitry of conventional (CMOS) solid-state design with maximum noise immunity and reliability. The most popular industry-wide sequences, ISA-A, ISA-F3A, ISA-M and ISA-R are available. Normally open/normally closed field contact logic for each individual channel is jumper switch-selectable on the single-board design. A system common trouble alarm (CTA) and a per point alarm transistor output may be utilized for remote group alarms, or fed to integrally mounted auxiliary contact relays. The additional plug-in printed circuit board and terminals mounted on an exchange rear panel upgrade the transistor-type output switches to dry contact outputs. The system's CTA and Re-Flash transistor outputs may be connected directly or via interface relays, mounted internal to the system, to provide inputs to remote annunciators, etc.

2.0 SPECIFICATIONS

Systems Voltage:
Logic, Lamps: 24 Vdc ±20%.
Field Contact Options: 24 Vdc Dry Contact, 125 Vdc ±20% live input or opto-isolated 115 Vac two-wire input (H and N).

Power Sources:
Systems External Power Supplies or Inverters Available for: 120 Vac ±20% 60 Hz; 240 Vdc ±20% 50/60 Hz; 24, 48 or 125 Vdc ±20%.

Temperature Range:
Storage: -40° to +85°C (-40° to +185°F).
Operating: -40° to +60°C (-40° to +140°F).

Inputs: *Contact:* Normally Open/Normally Closed; system internal interrogation voltage 24 Vdc standard, 48 or 125 Vdc optional.

Response Time: 10 msec nominal.

Surge Withstand Capability (SWC): *All Logic Tested to*: IEEE 472 – 1974, and ANSI/IEEE C37-90 – 1978.

Outputs:
Light: Fast flash, slow flash, steady on, intermittent fast flash.
Alarm: Single audible.
Auxiliary Relay: Form C, normally not energized.

Hermetically Sealed: Rating 2 A, 28 Vdc; 1 A, 115 Vac.
General Purpose: Rating 3 A, 28 Vdc; 2 A, 115 Vac.
Audible, Retransmit, Common Trouble Alarm Relay: DPDT, Rating 10 A, 28 Vdc; 10 A, 125 Vac.

Controls: *Integral or Remote Silence, Acknowledge, Reset, Test:* Momentary push button, single pole, normally open.

Systems Size: *Multiple of Cabinet Module:* 3.5" (89 mm) x 3.5" (89 mm).

System Weight: *Per Cabinet Module:* 1.5 lbs. (.69 kg) Not including power supply.

3.0 EXPANSION

The Series X11 Annunciator Systems may be initially ordered with an expandability option. This allows field expansion of the Monalarm System to either Binalarm or Trialarm and the Binalarm to Trialarm by simply replacing the alarm/lamp modules and the appropriate bezels.

4.0 AUXILIARY CONTACTS

The auxiliary contact outputs may be purchased initially or added later in the field. The single, dual or triple relay circuit module plugs in from the front of the system. The receiving multipin printed circuit connector and the terminals for the contact outputs are furnished on a small subpanel. The subpanel is mounted at the right hand section of the rear termination plate on each mechanical module in which auxiliary contacts are desired. Each relay follows the field contact logic explicitly and provides a Form C type contact. The relays are available in General Purpose or Hermetically Sealed versions.

5.0 MOUNTING

A. The annunciator is shipped with all of the alarm/lamp modules, filter module(s), auxiliary contact module(s) and flasher module(s) installed in the cabinet.

B. External horn relay(s), reflash relay, common alarm relay, relay sockets, horns, bells, push buttons and power supply are packed separately.

C. Install the alarm cabinet from the front of the panel. (For NEMA Doors see paragraph D).

1. Position the cabinet in the cutout so that the cabinet rests on the front extruded trim, see detail A. Make sure that the front trim is firmly against the panel, both top and bottom.

2. From the rear side of the panel insert the two halves of the clamp assembly (one half threaded and the other half unthreaded) in the groove of the front trim, see detail C.

3. Slide the clamps together until both holes align, see detail B.

4. Insert the jack screw and tighten to secure the cabinet in the panel. Install all the clamps the same way and be sure to tighten evenly.

5. Finally tighten up the lock nuts on each jack screw.

D. Systems purchased with NEMA 12 or NEMA 4 Doors require mounting of the door before Step C1. After removal of the mounting clamp assemblies, the system can be inserted through the open door, sandwiching the door between the panel and the system's extruded trim (gasket is furnished with door). Continue with Steps C1 through C5. **Note:** The panel cutout is the same as specified in standard flush mounted alarm systems.

E. Mount all external relays, horns and/or bells, push buttons and power supply on the panel or in the rear of the aunnunciator cabinet, where possible.

F. Wire system's inputs and system's support equipment as shown on page 7 (System's Support Wiring).

CAUTION

Before turning on power read page 8, Power Up and Test Procedure.

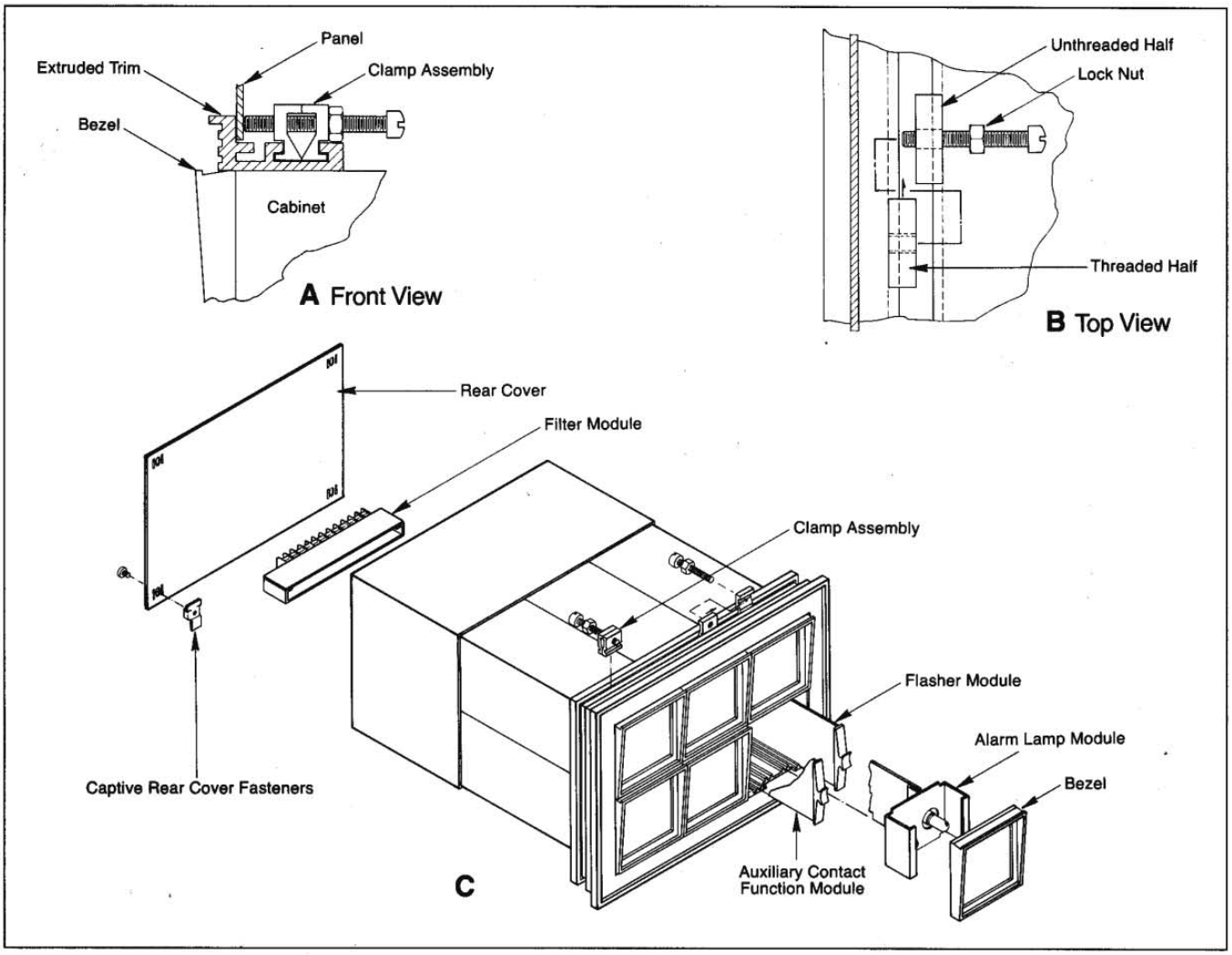
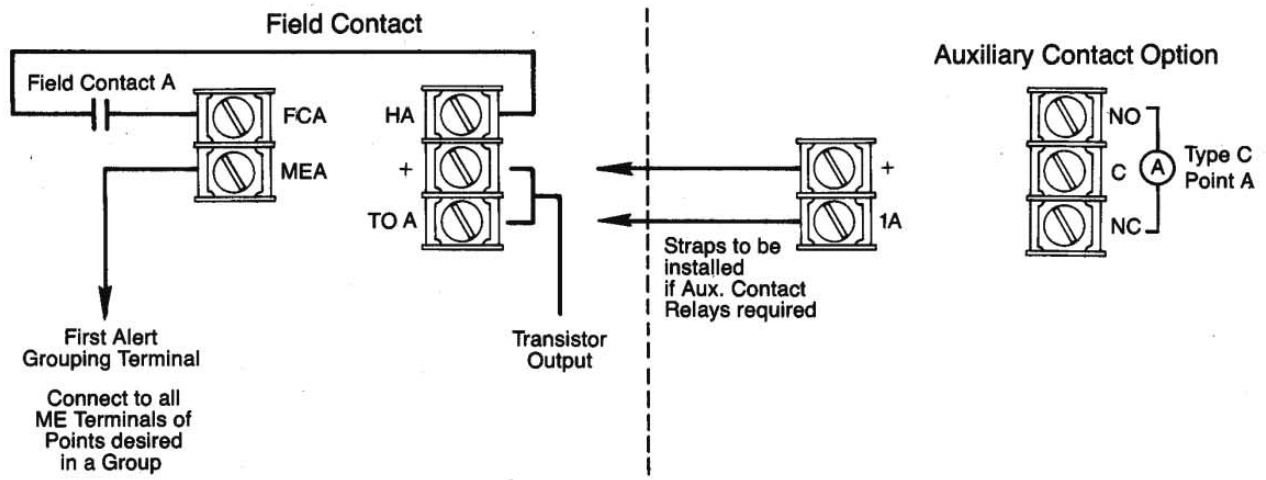


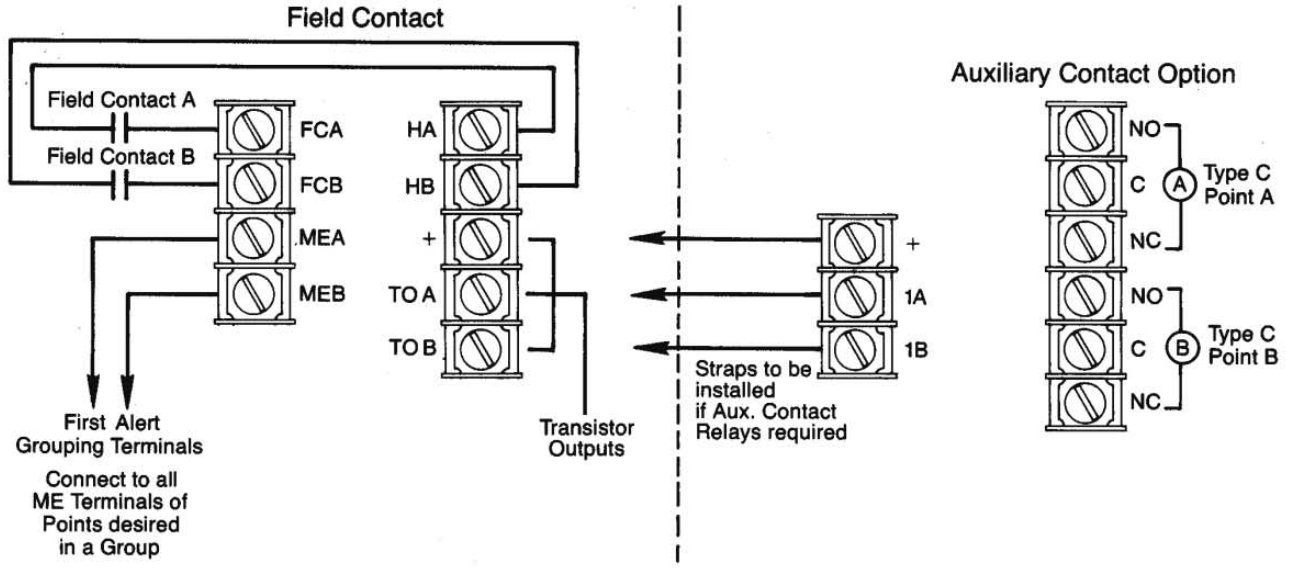
Figure 5.1: Panel mounting illustration.

6.0 WIRING INFORMATION

6.1 Model X11-1000

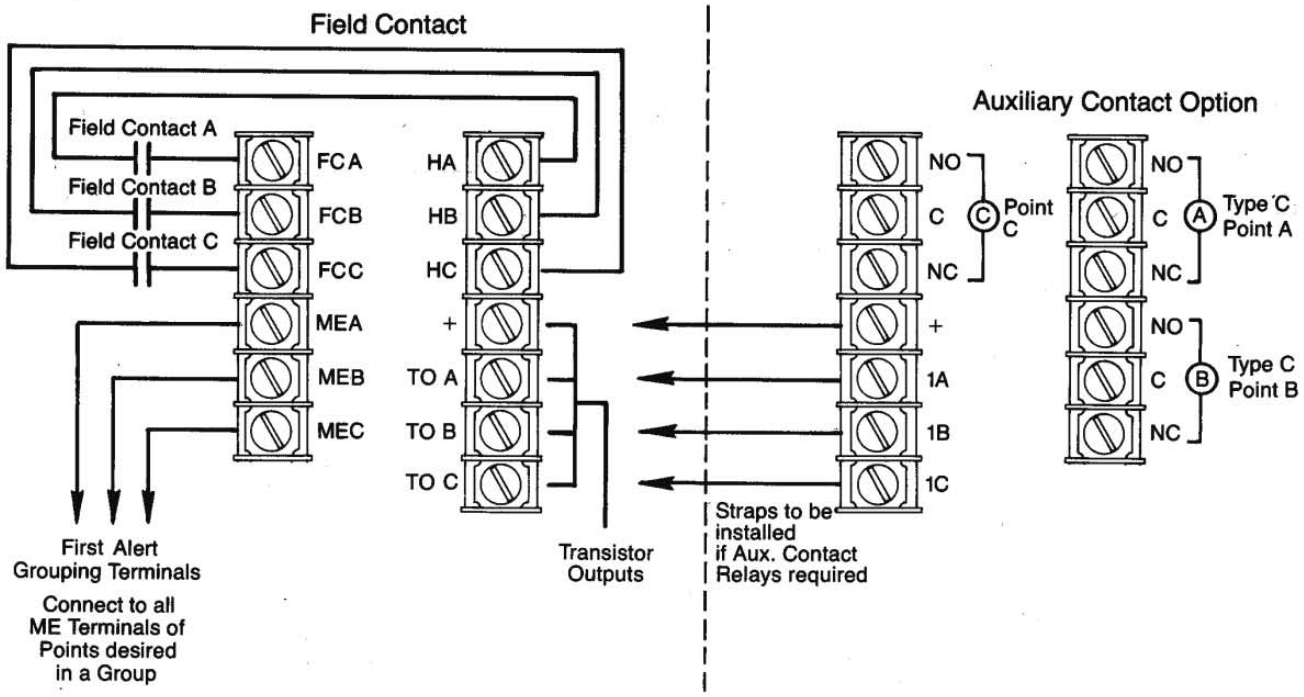


6.2 Model X11-2000

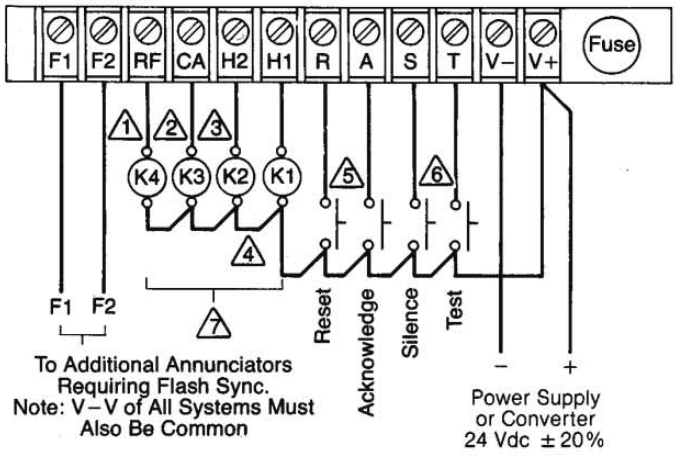


6.0 WIRING INFORMATION (CONT.)

6.3 Model X11-3000

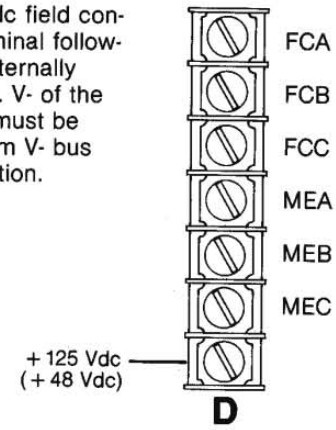


6.4 System's Support Wiring



6.5 125 Vdc or 48 Vdc Field Contact Applications

When 125 Vdc or 48 Vdc field contacts are used, the terminal following ME terminals are internally wired to all H terminals. V- of the live field contact input must be common with the system V- bus for proper circuit operation.



Notes:

1. K4 only used on systems where an output Re-Flash is desired.
2. K3 only used on systems where a Common Alarm Output is desired.
3. K2 only used for dual horn ringback systems only.
4. K1 and K2 are not required if Ronan X36 Electronic Horns are utilized. X36 Horns may be directly connected with red wire and V+ and blue wire to H1 or H2 respectively.
5. Reset Push Button utilized for Manual Reset, Ringback or First Out Reset Sequences only.
6. Silence Push Button utilized when horn silence is desired.
7. All relay coils must be 24 Vdc, 250 mA (Max.) SPDT or DPDT contacts are required. Standard relay KRP24DC for GP and KR7272 for hermetically sealed.

7.0 POWER UP AND TEST PROCEDURE

CAUTION

It is important to review all external equipment, including the alarm system, before turning on power and proceeding with testing. Before installing, verify that each component meets the area and environment standards required by the National Electrical Code. Particular attention must be paid to reviewing push buttons, horn relays, horns and bells, to see that they meet the right classification of the electrical code.

7.1 Wiring Inspection

7.1.1 Alarm Inputs: Each active alarm input must be wired to customer's sensing device to provide an opening or closing on alarm condition. The terminals on the alarm system for each alarm input are marked H and FC. The H terminal in the standard alarm system is the main system voltage that is supplied via a pull-up resistor on each alarm point. This resistor is used in the V+ source to each field contact to reduce the effect of large transients entering the alarm chassis. Each alarm input module is provided with a separate H terminal. However, it is common practice to run one common H wire to many field contacts to reduce the number of field wires required. When using a common H, it is important to jumper together the H terminals of the respective alarm cabinet modules to provide the correct amount of current source to the field contact.

The return wire from the field contact is wired to the FC terminal on each respective alarm module. Since the alarm system provides the power to the field contacts, it is important to verify that no other voltage source appears on either the H or FC terminals. **Note:** On alarm systems where the alarm inputs are supplied from transistor switch outputs, the V- of both systems have to be common. If the system under test has this feature, it must be verified by reviewing the electrical drawing, particularly the alarm module schematic.

In general, the solid state alarm system is a floating system. The V+ and V- should be verified as ungrounded.

7.1.2 Push-button Wiring: Verify that the push-button wires are correctly wired to all of the push buttons, including the push-button contacts. Use the transmittal enclosed with the purchased system for outline dimensions, rear terminal arrangements and printed circuit board schematics. Insure that normally open contacts are used. For example, if the wrong contacts (normally closed) are used, this is the same as having the operator pushing the push button continuously which obviously will drastically affect the operation of the alarm system. Alarm systems using multiple alarm cabinets may use a common set of push buttons to control the total system. We recommend a detailed check for proper installation, including diode type isolation, if specified on the electrical drawings.

7.1.3 Horn and Bell Wiring: If electrical horns are used, the horns can be directly connected to the audible output on the master terminals. Systems using the conventional ac or dc horns and bells, must use a horn relay with suitable contact rating. On multiple alarm cabinet systems where individual power input is preferred, a horn relay must be used with each cabinet to maintain electrical isolation.

7.1.4 Power Supply: Verify the correct polarity of connection to the alarm systems. In the larger system, it is important to verify the wire sizes of the power leads to the alarm cabinets. To protect the larger alarm chassis, it is common to provide more than one input to the cabinet in which each section is provided with a separate filter, fuse and supply input terminals. In cases with multiple supply input, it is necessary for the customer to make the parallel V+ and V- connections.

7.1.5 Normally Open/Normally Closed Field Contacts: All alarm modules are equipped for operation with normally open or normally closed field contacts. This is accomplished by using a jumper switch on each alarm module, identified as N.O. and N.C. for the normally open and normally closed position respectively. When the complete system is in operation, the field contact that opens with an alarm condition is termed a "normally closed" alarm input; conversely, the field contact that closes with an alarm condition is termed a "normally open" alarm input.

7.1.6 Power Up: Carefully inspect the hookup wiring to insure conformity with the furnished schematic. Pay particular attention to power source polarity and ascertain that the ME terminals (First Alert Sequences) are connected only to other ME terminals. Now remove the alarm modules one at a time and determine whether or not the normally closed/normally open switch is in the proper position and re-insert the card firmly, seating it in the connector. Power may now be applied to the system.

Upon power application, the flasher module within the system will automatically initiate a reset cycle. The system should then be in a quiescent state with the horn(s) off and no lamps flashing. Some lamps may, however, be on if

their associated field contacts are in an abnormal condition.

Depression of TEST should cause all extinguished lamps to come on flashing and the audible alarm to sound. From this point onward, refer to the particular Sequence Charts to obtain normal system operation. When testing an online system, be alert to the possibility that an actual alarm may initiate during the test procedure and appear to give conflicting results.

8.0 TROUBLESHOOTING

8.1 General

Simple attention to the obvious can often solve what appears to be a problem in the system.

A. A burned out or broken bulb or bulb pair not properly seated in their bases will not light.

B. Alarm modules not properly seated in their connector will prevent alarm point(s) testing.

C. Alarm point pull-up resistors could be broken or burned providing no voltage at the H terminal.

8.2 Alarm System Non-Operating

A. Verify that the power source is operating and that the V+ to V- voltage on the rear terminals is in the range 20-28 volts. (Below 18 V, operation may prove erratic.) Be sure to verify polarity.

B. If the power supply fuse blows each time power is applied:

1. Check the Power Supply Parts List for proper fuse size.

2. Remove Alarm System from the supply and try again. If fuse holds, double check polarity and reconnect. If fuse still blows, remove all alarm modules and flasher and try again. If the fuse blows at this point, the problem has been isolated to the filter or a short in the internal wiring. A possible source of trouble is the diode on the Filter Module (RF-24). Substitute a fresh filter module or remove the diode and try again. The system may be run without this diode, but do not apply reverse polarity to the system with CR1 removed as damage will result.

C. If power remains on but any or all push buttons (SILENCE, TEST, RESET, ACKNOWLEDGE) do not appear to function:

1. Verify proper wiring by measuring the voltage at terminal T, A, S and/or R as applicable. Voltage measurements are taken with respect to the V- terminal and should in all cases be zero volts with the button released and V+ (20-28 Vdc) with the button depressed.

2. If the problem persists, the Filter and/or Flasher Module are suspects. Replace the Flasher Module and try again. The Filter contains only passive components and is not likely to fail.

3. Be alert to the possibility that a single board can, under unique conditions, cause what appears to be a system malfunction. Two example of this are the following:

a. If the Horn fails to silence, the trouble could be one module only failing to silence.

b. If a large group of First Alert points comes on steady rather than flashing during TEST, one board can be sending a signal to all of the others. A failure of the flasher or the Test circuit is not necessarily indicated.

c. In either of the above cases, remove Alarm Modules sequentially and repeat testing until the trouble clears.

d. As a general rule, common sense in isolating the trouble will prevail. If one or more alarm boards appear to be malfunctioning, remove them from the system entirely before continuing, fill their positions with boards from the upper left or lower right of the system so as to concentrate known good modules, and then proceed with diagnostic and analysis of the remainder. Working with several scattered, diverse problems simultaneously is nearly always self-defeating.

e. Refer to the section on TEST, page 6, for further procedures.

8.3 Step-By-Step Procedure

A. Check the system voltage and verify polarity of supply input voltage and that the system is not grounded.

B. Isolate all external devices except the input power connections.

C. Unseat all alarm/lamp modules except the No.1 alarm point. At this point the only items plugged into alarm chassis are one alarm module, flasher horn driver module and filter module. Jumper the push-button input terminals on the master module to simulate the correct connections for operations of the alarm system (since only normally open push-button contacts

are used for all push-button functions, no connections will be made for normal operation).

D. Connect a simulating set of devices to replace the field contact as shown on the electrical schematics on alarm position No. 1.

E. Using the simulating field contacts and following the Test Procedure instructions, check the sequence operation of the annunciator.

F. If the first alarm module does not operate correctly, replace the flasher module, then the filter module to eliminate the possibility of a faulty flasher and filter module. Once established that the flasher and filter are correct, the fault will probably lie in one of the following areas:

1. A faulty alarm/lamp module.
2. +24 Vdc on H missing.
3. Chassis wiring fault such as a short or cold solder joint.

G. After checking for proper operation of H output, remove the No. 1 alarm module and insert the No. 2 alarm module in the No. 1 chassis position. If the No. 2 alarm module operates correctly, this indicates that the No. 1 alarm module is faulty. Should the No. 2 alarm module not function in the No.1 chassis position, the fault lies in the chassis wiring.

H. If the failure is isolated in the chassis wiring, we recommend removing each alarm input terminal plate and inspecting for foreign objects which might cause a short. Review for any damaged wiring or broken connections to the printed circuit board connector. Finally, if the above procedure does not produce the solution to the fault, we recommend a thorough review of all solder joints.

I. Should No. 1 alarm function correctly, continue with the same procedure for checking all alarm/lamps modules by seating each module and using a simulating field contact switch at each alarm point. After the testing, should all the alarm/lamp modules function correctly, it must be assumed that the entire alarm system and modules are not faulty.

At this point, the error is now confined to the external wiring, possible push button or external equipment miswiring, or a short in the field contact wiring.

J. To avoid further damage to new alarm modules, do not place another alarm module into an alarm position that has produced circuit board trace failures. A detailed review of the trace failure will determine the reason for the failure. In most cases, damage can be the result of high voltage inputs or shorting in the chassis.

9.0 ALARM MODULES

9.1 Alarm Sequence/Display Module

The Model X11 is offered in two separate dual sequence configurations: ISA-A, ISA-M or ISA-F3, ISA-A. The field selection is chosen by

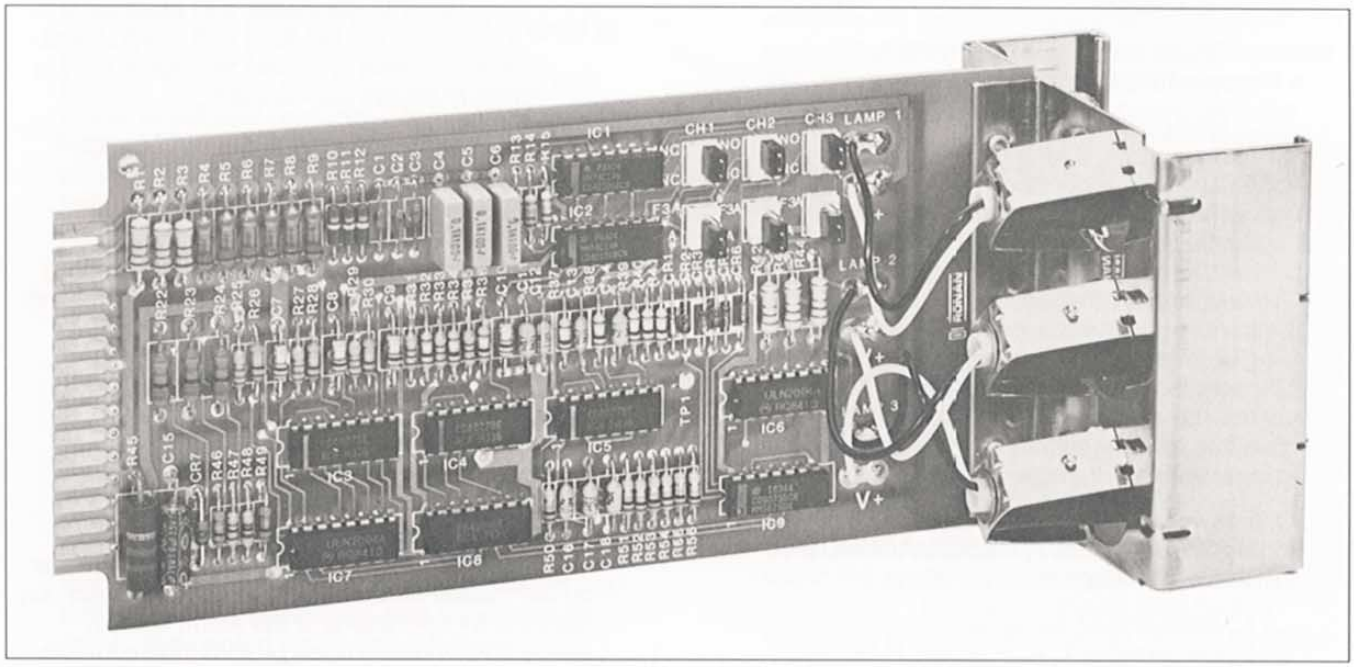


Figure 9.1: X11/3-F3A/A.

on board switch settings. ISA-R is also available. The combination display/alarm module contains a single, dual or triple alarm channel circuit with the appropriate dual lamp display constructed as a single plug-in module. The modules are removable from the front of the system without interference to the remaining channels of the system. The window display areas are contained within Ronan's standard colored bezels, allowing multiline engraving on single or sandwich lenses. The alarm logic may interface with a normally open or normally closed field contact. The field contacts are interrogated by the system's 24 Vdc logic supply, or optionally, with 125 Vdc from a dual output power supply, if so specified. In addition, the module's input circuit is designed to accept open collector or logic voltage without external components.

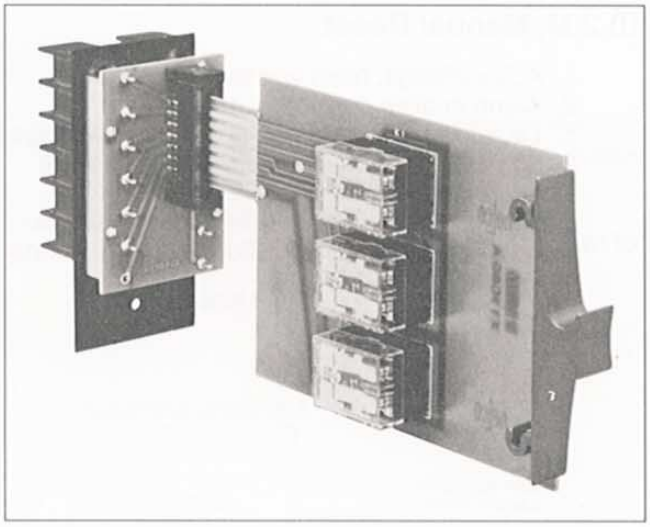


Figure 9.2: Auxiliary Contact Module.

9.2 Output Features

The Module X11 System provides a common trouble alarm (CTA) output, presented on the master terminal assembly. This output drives the system's internally or remotely mounted relay to annunciate an alarm condition if any one or more points in the system are in alarm. A second output, also presented on the master terminal assembly, features a reflash signal which allows reannunciation to a remote system if any one window goes into alarm. In addition, each field contact input is repeated and presented as an output on rear terminals by way of an open collector transistor. These outputs allow multi-grouping of alarms, or they can be utilized to drive internal auxiliary contact repeater relays, which will provide form C contacts available on the corresponding rear mounted terminals.

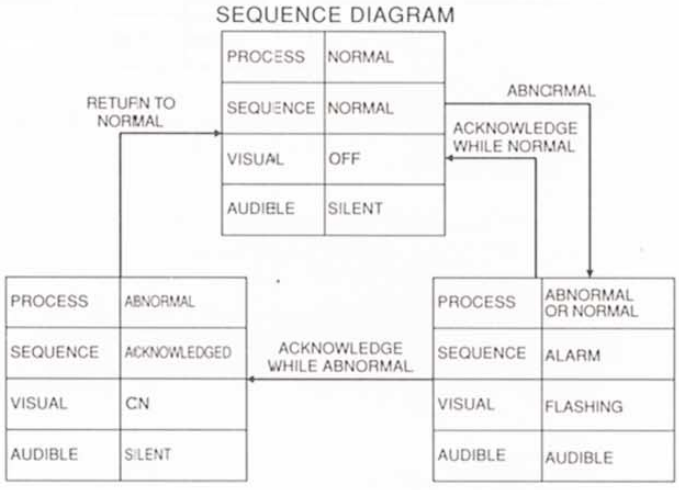
9.3 Auxiliary Contact Module

The auxiliary contact module is available with a single, dual or triple relay circuit, accommodating the window density selected. The modules plug in from the front of the system and may be purchased initially or added later in the field. The terminals for the contact outputs are furnished on a small subpanel to be mounted on the rear terminal plate of each mechanical module. Each relay provides a Form C type contact with a rating of 3 A at 28 Vdc, or 2 A at 115 Vac for the General Purpose type, and 2 A at 28 Vdc, or 1 A at 115 Vac for Hermetically Sealed relays.

10.0 SEQUENCES

10.1 A, Automatic Reset

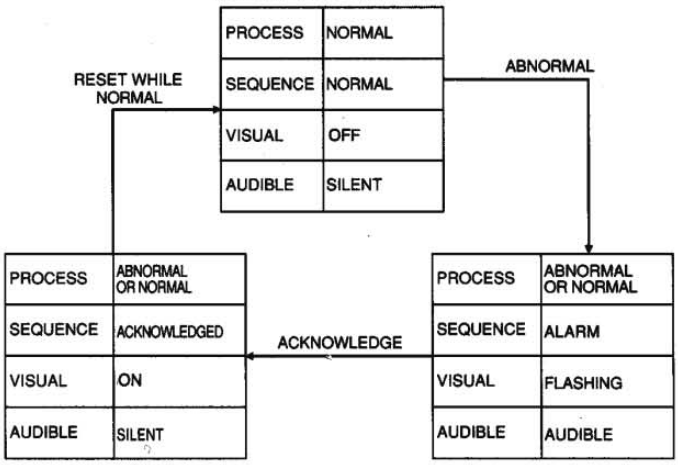
1. Acknowledge and test push buttons.
2. Alarm audible device.
3. Lock-in of momentary alarms until acknowledged.
4. The audible device is silenced and flashing stops when acknowledged.
5. Automatic reset of acknowledged alarm indications when process conditions return to normal.
6. Operational test.



10.2 M, Manual Reset

1. Acknowledge, reset and test push buttons.
2. Alarm audible device.
3. Lock-in momentary alarms until acknowledged.
4. The audible device is silenced and flashing stops when acknowledged.
5. Manual reset of acknowledged alarm indications after process conditions return to normal.
6. Operational test.

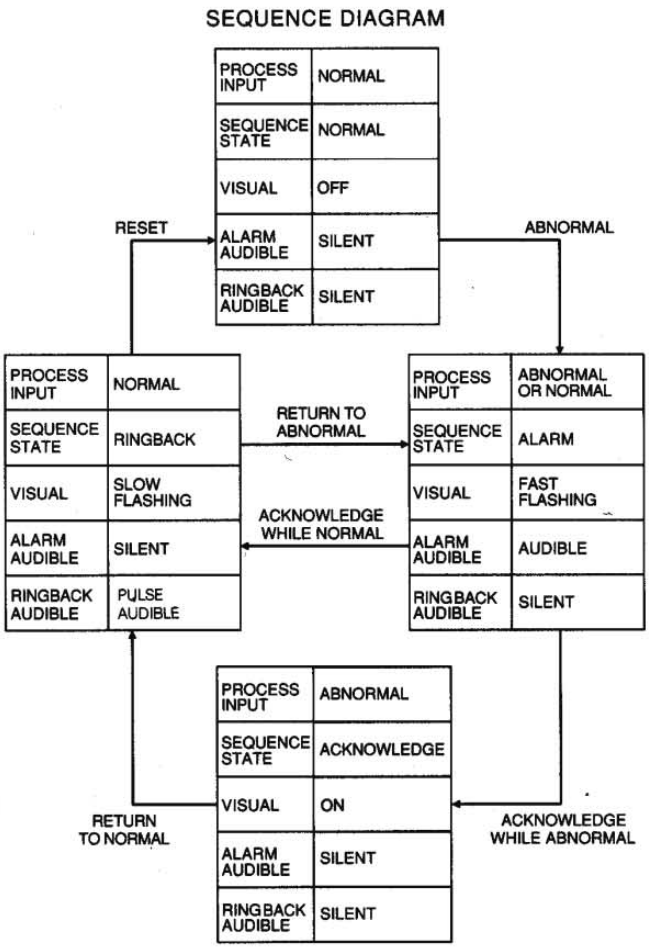
SEQUENCE DIAGRAM



10.3 R, Ringback

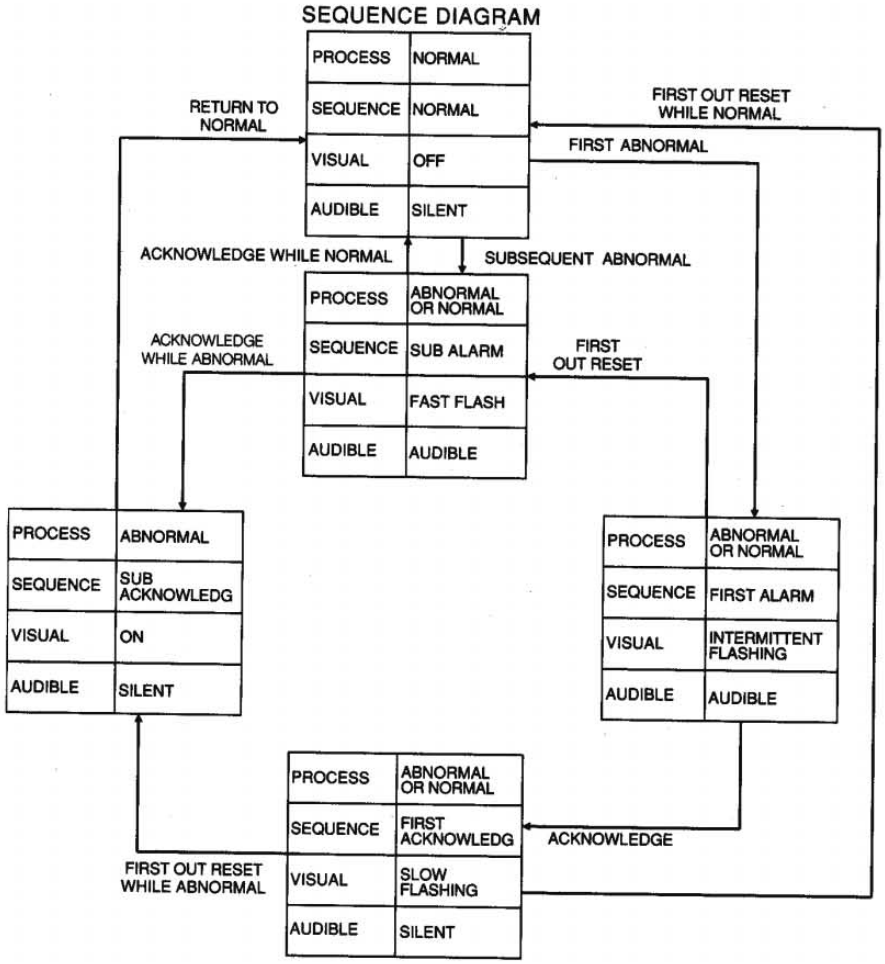
1. Acknowledge, reset and test push buttons.
2. Alarm audible device.
3. Momentary ringback audible device.
4. Lock-in of momentary alarm until acknowledged.
5. Different alarm flash rates to distinguish alarm state and ringback (return to normal) state.
6. Operational test.

SEQUENCE DIAGRAM



10.4 F3A, Automatic Reset First Out With First Out Flashing and Reset Push Button

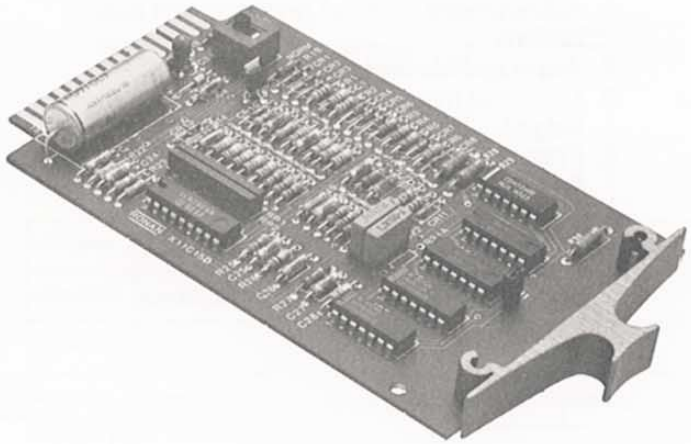
1. Acknowledge, first-out reset and test push buttons.
2. Alarm audible device.
3. Lock-in of momentary alarms until acknowledged.
4. First-out flashing different from subsequent flashing.
5. First-out reset push button to change the first out visual indication to be the same as subsequent visual indications.
6. Automatic reset of acknowledged alarm indications when process conditions return to normal.
7. Operational test.



11.0 SYSTEM SUPPORT MODULES

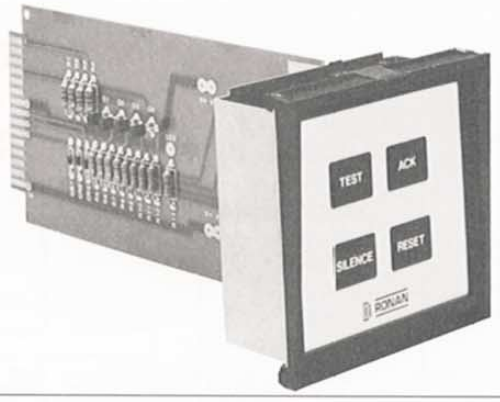
11.1 Flasher Module

The dual frequency flashing signal generator and the push-button audible alarm interface are furnished by the flasher module. The flasher is master/slave selectable to allow synchronization of flash rates in multi-system application. The module is designed to drive up to 150 points of alarm and the horn drivers' capabilities are sized to power a Ronan X36-24 Electronic Horn or a KRP-24 Vdc Horn Interface Relay to actuate 115 Vac, 220 Vac, 24 Vdc or 125 Vdc Horns or Bells. For convenience purposes, the module is always located behind the lower right hand module of the system.



11.2 Push-Button Module

The push-button module may be supplied with three or four buttons, depending on the alarm sequence selected for the system. In addition, the module contains filter components to protect the system from noise generated on external push-button lines.

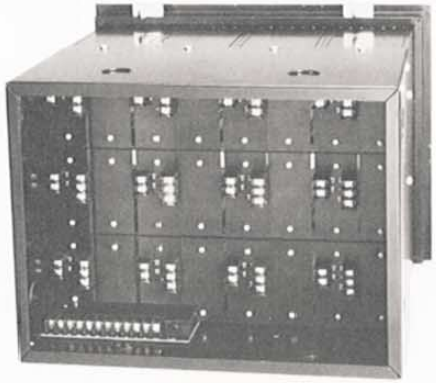


11.3 Filter Module

All remotely located push buttons and dc power input lines are fed to the system via integral filter modules, servicing up to 50 alarm points (36 points for 1000 Series). For systems with more alarm points, additional Filter Modules RF-24-2 are used.

11.4 Master Terminal

The remote push buttons, audible alarm and power wiring are terminated at the Master Terminal Assembly located on the rear of the system's chassis. Polarity protection, to prevent reverse power hookup, and a system fuse are an integral part of the Master Terminal Assembly.



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