Catalyst®

SINCE 1948
RACO®
REMOTE ALARMS AND CONTROLS

A new era in data communications

…Introducing the world's first integrated, interactive data logging and alarm notification system

Finally…one flexible system is all you need for all your data and event logging, alarm notification, and status checking needs. RACO's Catalyst® Interactive Communications System provides an up-to-the-minute, two-way connection with your critical data—whether through traditional phone, pager, cell phone, e-mail, or fax channels.

Data Logging with Immediate Access

Now you can perform data logging and get an immediate report—without going to the site.

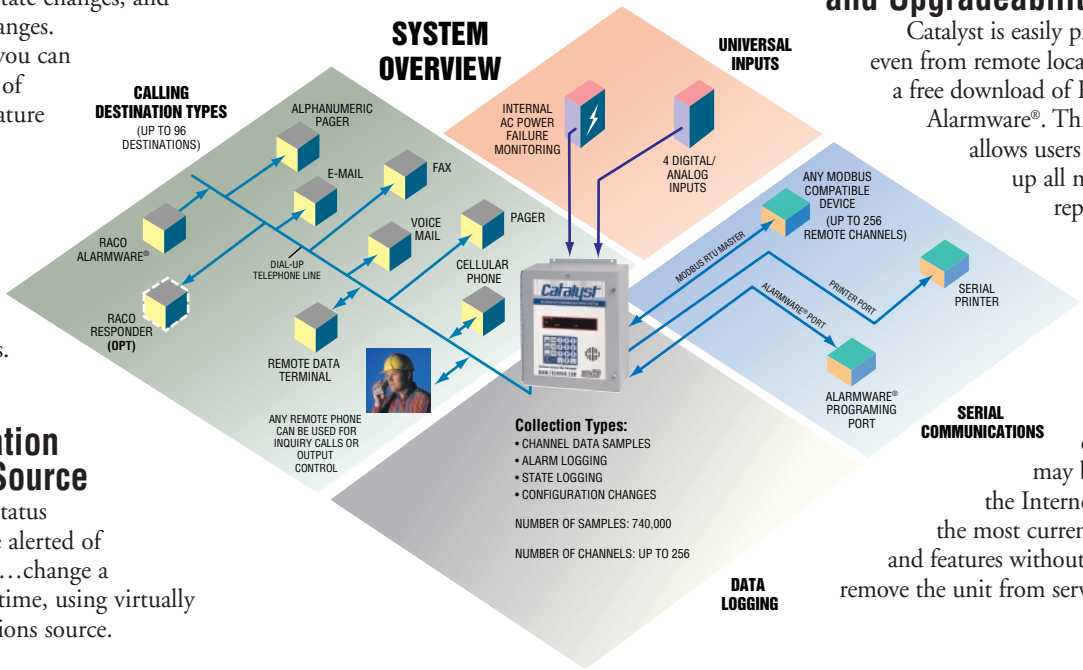
RACO's Catalyst monitors up to 256 points to provide extensive data and event logging capabilities. Featuring up to five megabytes of on-board memory, the system can monitor data samples, alarms, channel state changes, and configuration changes.

At any time, you can obtain the status of level and temperature indicators, flow meters, switches, annunciator panels, motors, pumps, compressors, PLCs, SCADA systems, and other devices.

Constant Communication Using Any Source

Download a status report today…be alerted of alarm conditions…change a parameter…any time, using virtually any communications source.

With Catalyst, you're always in touch—via phone, fax, e-mail, voice mail, pager, or cellular networks. For general or keyword-selectable information, contact Catalyst. One of your pumps is down? Catalyst contacts up to 96 user destinations, communicating the alarm location and status in a voice message. Or Catalyst can report the condition to a central computer.



Versatile Inputs and Interfaces

Catalyst features 4 standard internal inputs that are easily configured to sense digital or analog signals, and 56 remote channel inputs that are expandable to 256.

The system interfaces with any PLC, or with any other device using Modicon's Modbus protocol, using only RS232 communications.

Easy Programming and Upgradeability

Catalyst is easily programmed—even from remote locations—with a free download of RACO Alarmware®. This software allows users to quickly set up all monitoring, reporting, and control functions. A PIN-based security system safeguards all settings. Upgrades are simply downloaded and may be accessed from the Internet, so you can get the most current functionality and features without ever having to remove the unit from service.

Standard Features

Total Channels: up to 256 points monitored including channels interfaced via Modbus, and four internal universal (analog/digital) inputs

Protocols: Modbus RTU protocol built-in. Interfaces to PLCs, Distributed I/O, DCSs, etc.

User Memory: up to 5 MB of memory for user speech and data log file

Internal Log File: collects periodically sampled channel data, alarms, state and configuration changes. Log file transfers to faxes, data collection stations, and RACO Alarmware®

Dialouts: calls up to 96 different destinations

Destination Types: traditional voice phone, numeric and alphanumeric pagers, faxes, e-mail, data log collection stations, RACO Central Station, and PA Systems

Channel Grouping: may assign channels to different destination groups for responsible personnel targeted calling

Voice Messages: up to 45 minutes of voice messages

Configuring: programmed via front panel, remote telephone or Alarmware Software

RACO Alarmware Software: locally or remotely configures units, collects log files and maintains configurations for multiple units

Firmware Upgrades: use Alarmware to upgrade unit without changing hardware or returning unit to factory

Battery Backup: 10 hours

Warranty: five years

Standard Specifications

IO/SENSING

4 physical universal inputs

Monitors 56, 96, or 256 Modbus addresses

DATA LOGGING

Frequency Interval: 10 sec-24hr

Number of samples: up to 740,000

Number of channels: up to 256

TELEPHONE

Dialing Methods: selectable Touch-Tone or pulse dialing

Total Destinations: up to 96 different numbers; each up to 255 digits long

Destination Types: traditional voice phone, numeric and alphanumeric pagers, faxes, e-mail, data log collection stations, RACO Central Station, and PA Systems

Alarm Acknowledgement: Touch-Tone key, by calling back, or Alarmware

Speakerphone: built-in for two-way on-site calling

PBX Delays: programmable in increments of 1 second

Compatibility: compatible with most cellular telephone systems

FCC Registration: Part 68, "Ringer Equivalence": 0.3A

SPEECH MESSAGES

Users record their own messages. Also includes resident vocabulary for programming guidance and for default "alarm/normal" speech if no user messages are recorded.

PROTOCOLS

Modus RTU Master

CONNECTIVITY

Modbus port: RS232 9 pin D Sub male
RS485 9 pin D Sub male

Alarmware Programming port: RS232C 9 pin D Sub male

Serial Printer port: RJ45 modular connector

ELECTRICAL

Universal Input Sensing:
Digital: unpowered contact inputs, open contacts see 5 volts DC; closed see 10mA DC
Analog: 4-20mA current loop, scalable in engineering units, resolution: 0.1%, accuracy: 10 bits

Power requirements: 105-135 VAC, 50/60 Hz, 15 watts maximum or 8-14 VDC at 500mA maximum

Power Consumption: standby 420mA, active 450mA

Battery Backup: 10 hours

Battery Charging: precision voltage controlled, including automatic rapid recharge after drain

Surge Protection: integral gas tube and solid-state protectors on all phone, power, and signal lines

PHYSICAL

Rugged metal indoor enclosure:
Weight: 8 lbs. (3.6 kg)

Dimensions: 11-7/8" H x 9" W x 5" D

Mounting Centers: 11-3/8" vertical x 6" horizontal

ENVIRONMENTAL

Temperature Range: 20° to 130°F

Humidity: 0 to 95%, non-condensing

UL STANDARD

Catalyst complies with UL Standards: 1459, 1950

WARRANTY

Five-year parts and labor warranty. See our separate warranty card for details.

Accessories

4 MB Memory: 4 MB Memory upgrade for the following models: C10-S-020-1450 and C1S-S-020-1450

NEMA 4X Enclosure: fiberglass NEMA 4X enclosure, water tight/dust tight with locking hasp

Serial Printer Cable: 6' Catalyst to serial printer cable

Modbus Cable: 6' Catalyst to Modbus cable

Alarmware Cable: 6' Catalyst to computer cable

Cellularm: Cellularm cellular telephone communications system for the Catalyst. Includes cellular telephone, 12 hour standby battery, "Rubber Ducky" antenna, and a NEMA 4X enclosure that houses all the above components

Power Supply: UL approved, CSA/UL approved

Environmental: heater with thermostat control

Catalyst® Models

C10-S-020-1450
Monitors 56 total channels including 4 internal digital/analog inputs, 1 MB memory, 120 VAC power source

C10-1-020-1450
Monitors 96 total channels including 4 internal digital/analog inputs, 5 MB memory, 120 VAC power source

C10-2-020-1450
Monitors 256 total channels including 4 internal digital/analog inputs, 5 MB memory, 120 VAC power source

For ordering information, call toll free at…800-722-6999.

1948-1998 50th ANNIVERSARY

SINCE 1948
RACO®
REMOTE ALARMS AND CONTROLS

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CATALYST INTERACTIVE COMMUNICATION SYSTEM SPECIFICATION

May 4, 2001

Summary Overview Description:
The unit shall be capable of continuously scanning its own physical input channels plus channels at specific address locations within a variety of Remote I/O (RIO), Programmable Logic Controllers (PLCs), Distributed Control Systems (DCSs) & SCADA systems, using the standard Modbus RTU industrial network protocol. Connection for Modbus connected channels shall be via a single serial interface cable. The unit's built-in channels shall be four universal (analog/digital) physical inputs.

The unit shall be able to monitor, log events, and take data samples for all channels plus its own primary power source and phone line. For alarms, scheduled reports, and log data file transfers, the unit shall be capable of dialing up to 96 destinations (phone numbers), each up to 60 digits in length, organized by group lists as configured by the user. Destinations types shall include voice telephones, log data collection stations, pagers, and fax machines. Report types shall be configurable, as appropriate for different destination types, to include report items such as alarms, events, configuration changes, and periodically sampled channel data logs.

The unit shall also allow incoming calls for the purpose of checking primary power and channel status, making configuration changes, and for retrieving data logs. Incoming calls shall be allowed from voice telephones, data collection stations, and from the Raco® Alarmware® software. Inquiry and programming calls, if so configured, shall require that users enter their unique 4-digit PIN password in order to proceed in receiving reports or configuring the unit.

1. User Configurable via Front Panel, Remote Telephone or Raco® Alarmware® Software:
The unit shall be capable of being configured via a local or remote computer running Raco® Alarmware® software under Windows 95/98, or alternatively via the system's keyboard, or via a Touch Tone phone, at the user's choice. No reliance on physical jumper or switch settings shall be necessary for configuring the unit. All programming including speech files shall be capable of being copied, stored, edited and transferred via the Raco® Alarmware® software. Further, the entire operating firmware (the microprocessor instruction code, not just user programming data) shall be upgradeable via transfer from a remote computer, without need to travel to the unit's location.

2. User Flash Memory for Data Logging and User Voice/Text Messages
The unit shall include a minimum of 1 Megabyte of user flash memory to be used both for user recorded voice and text messages and for the data logging file. Orderable options shall be available to increase the size of user flash memory to 5 Megabytes total.

3. Data Logging
Data logging shall be configurable to log, with date/time stamps, events and periodic data samples. Logged events shall include: alarms, acknowledgments, channel state changes, and configuration changes made during front panel and remote operator sessions. Logged periodic data samples shall consist of snapshots of all configured channel values and alarm states.

The unit shall be able to automatically deliver data logs to destinations configured as faxes, local data logging (LDL) printers and as remote data logging (RDL) computers running generic data collection software. Data logs shall also be retrievable by the Alarmware® software. Data logs shall be transferred in the formats of: plain text, comma-delimited fields, and comma-delimited key word fields. The latter two formats shall be importable into spreadsheet programs such as Microsoft Excel.

The total amount of user flash memory shall be shared between user messages and the log file. The amount of user flash memory reserved for data logging shall be configurable. The user shall be able to set a “buffer nearly full” threshold percentage, which when reached, will cause automatic calls to RDL logging destinations to automatically transfer the accumulated log file. Receipt of these automated download calls shall be via a computer running generic communications software.

4. Local Data Logging:
The unit shall include a serial printer interface for local data logging. The local printer will automatically print out, with date and time stamp, events, alarms, acknowledgements, programming sessions, inquiry calls, plus data samples at the selected sampling interval.

5. Event Logging/Audit Trail Feature:
The unit shall maintain a log of events which can be retrieved, reviewed and printed at any time locally or remotely via Raco® Alarmware® software, providing a complete audit trail for all alarms, programming sessions, incoming calls, acknowledgements and other relevant events, user configurable to allow in excess of 1,000 events to be retained. If PIN password security is configured, the PIN holders name (not secret PIN number) shall be noted on data logs for all events requiring PIN entry.

6. Voice and Text Message Features
The unit shall be capable of recording and re-recording speech messages in the user’s own voice, which shall be stored in permanent non-volatile solid state user “flash” memory. The unit shall allow these recordings to be made from a remote telephone as well as from a built-in microphone at the front panel.

Total Available Message Recording Time at the “high-fidelity” recording rate setting shall be 4.8 minutes for units with 56 input channels or less, and 24 minutes for units with larger numbers of channels. These times shall be doubled for the “utility” recording rate setting. The total message recording time may be allocated among the various messages without restriction as to length of any given message, and any given message shall be recordable at either rate for maximum flexibility. Additional user flash memory for additional recording time (and data logs) shall be an orderable option. Recordable message elements shall include at a minimum:

•Two message segments for each input channel, which may be used for “normal” and “alarm” indications or for two-part analog reports.

•A separate Station ID message, which is automatically included at the start of each report.

•A variety of “Tag” words, which are automatically appended to each input channel report, indicating various stages of alarm and acknowledgement for that channel.

In addition to user-recorded messages, the unit shall incorporate:

•Alternative Generic Default Speech Messages for use when the user elects to not record any or all of the above message types.

•Provision for user programmable Text Messages corresponding to each of the voice messages, which are automatically substituted for voice messages in any reports directed to text-type destinations such as a computer file, fax report or other printout.

7. Input Channel Monitoring Function:
The unit shall continuously scan all configured input channels on the Modbus serial connection and the four internal physical input channels. The unit shall be capable of monitoring any data register regardless of register type, whether digital, analog, input, output or status point. Alarm criteria shall be settable as appropriate for different data register type.

A. For digital channels, alarm criteria shall be settable for alarm on 0 raw value, 1 raw value, or alarm never (for status reports only).

B. For analog channels, both a high setpoint and a low setpoint alarm criteria shall be settable.

C. All channels shall have settable alarm criteria for alarm on serial communications failure only.

In addition to monitoring the readings of designated input locations, the unit shall be configurable to automatically and continually write the values read at designated input locations into other designated register locations. Also it shall be possible to manually write values into register locations from the front panel, via remote telephone or via Raco® Alarmware® software.

8. Alarm Reports to Destinations:
After the expiration of programmed Alarm Trip Delays, loss of primary power or violation of channel alarm criteria shall cause the unit to go into alarm state and begin dial-outs to destinations configured to receive alarm reports. Further, upon failure of any communications channel the unit shall enter the Communications Failure alarm state and begin contacting destinations.

Selectable Destination types shall include voice telephones, pagers, fax, email, remote data terminals such as computers running generic communications software, and a locally connectable serial printer.

Destination-Channel grouping shall be programmable to designate which destinations are to receive calls and reports initiated by which input channels.

Each Destination shall be independently configurable as to which categories of reports are to be delivered to that destination.

Text mode reports shall be configurable as full text, comma delimited text or comma delimited key words, independently for each Destination.

9. Multiple Call Attempts to the Same Destination
Using Call Progress Monitoring (CPM), the unit shall be capable of making multiple repeat calls to a busy or non-answered phone number before moving on to the next phone number.

10. Phone Line Testing
Phone line testing shall be programmable to test the unit's phone line at regular intervals and to provide local indication if there should ever be a failure of the phone line. In this event, when the phone line is later available, the unit shall place alarm report calls to advise that a phone line fault had occurred.

11. Alarm Acknowledgement
Alarm report calls shall continue at programmed intervals indefinitely until acknowledged.
Acknowledgement of an alarm phone call shall be accomplished by pressing a Touch Tone "9" as the alarm call is being received, and if so configured, by returning a phone call to the unit after having received an alarm call, or via the front panel keypad. If so configured, the user's 4 digit PIN password shall be required to hear the report and to acknowledge alarms.

The unit's log file shall maintain event records of all alarms, acknowledgements and incoming calls and that log file shall be retrievable at any time to provide an audit trail record.

12. Diagnostics:
The unit shall be capable of executing user commands for diagnostics on the Modbus RTU network to determine the health of the network. The unit shall inform the user of the length of scan time for the set of all configured channels on the network.

13. Primary Power and Battery Backup:
Normal primary power shall be either 105-135 VAC, 15 watts nominal, or 12 VDC at 900 ma maximum. Orderable options shall include 240 VAC and 24, 48 or 125 VDC. The unit shall contain its own sealed lead acid rechargeable battery that is automatically kept charged when primary power is present. The system shall operate on battery power for a minimum of 10 continuous hours in the event of primary power failure. A shorter backup time shall not be acceptable. The built-in charger shall be precision voltage controlled, +/- 1%, not a "trickle charger," in order to minimize recharge time and maximize battery life available.

14. Phone Line, FCC approvals:
The unit is to use a standard rotary pulse or Touch Tone "dial-up" phone line (direct leased line not to be required) and is to be FCC Part 68 approved with a valid registration number. Connection to the telephone is through a standard modular jack (RJ-11). The unit shall conform to FCC Part 15B for EMC emissions.

15. PIN Security Protection:
The unit shall incorporate four separate levels of PIN password protection:
Read (inquiry) only
Acknowledge
Change Configuration Settings
Administrator

16. Public Address Broadcast:
The unit shall include a jack for optional connection to a local public address system. If connected to the PA system the dialer shall broadcast all alarm messages over the PA system and the telephone simultaneously.

17. Integral Surge Protection:
All power, phone line and discrete physical signal inputs shall be protected at the circuit board to IEEE Standard 587, category B (6,000 volts open circuit/3,000 amps closed circuit). Gas tubes followed by solid state protectors shall be integral to the circuit board for each such line. Protectors mounted external to the main circuit board shall not be an acceptable substitute. The installer shall provide a good electrical ground connection point near the unit to maximize the effectiveness of the surge protection.

18. Technical /Customer Support:
All users shall be provided and/or shall have access to the following support resources.

A. A toll free 800 number shall be available during manufacturer's normal working day to permit users to talk directly with technical service personnel and resolve problems not resolved by either the Catalyst CD-ROM or the Technical Support information provided at RACO's website www.racoman.com.

19. Warranty:
The unit shall be covered by a five (5) year warranty covering parts and labor performed at the Factory.

20. Memory Upgrades, Remotely Downloadable Firmware Modifications:
The unit shall permit expansion of memory capacity via available plug-in memory modules. Firmware upgrades shall be possible from remote computer locations without need to travel to the unit's location, as well as at the unit's location via serial port connection if so desired.

21. Additional Features: Sealed Switches, LED Indicators, Alarm Disable Warning:
All keyboard and front panel switches shall be sealed to prevent contamination. Front panel LED's shall indicate: Normal Operation, Program Mode, Phone Call in Progress, Status for each channel or group of channels, AC Power Failure, and Low, Discharging or Recharging Battery, and Disarmed state. On any Inquiry telephone call or On Site status check, the voice shall provide specific warning if no destinations are configured, if the unit is in the "alarm disable" mode, or if AC power is off or has been off since the last report.

22. Special Order Items:
The following options shall be available on specific order:

a) Cellular wireless telephone communications
b) NEMA 4X (sealed) enclosure.
c) Thermostatically controlled heater (on AC powered units only).
d) Additional Flash memory capacity
e) Additional remote channel monitoring capacity

Specifications subject to change without notice.

2.0 Catalyst Hardware Installation

2.1 Location and Mounting

Choose a mounting location that is not exposed to condensing humidity, or temperatures beyond the limits of +20 to +130F (-7 to +55 C). If installing outdoors, a sun shield may be necessary to protect against the elevated temperatures that can be produced on exposed objects during a hot day.

This location should ideally be within 5 feet of a standard RJ- 11 phone jack and a grounded 120 VAC power outlet (or other power source as applicable). Allow at least 3 inches clearance below the lower edge of the enclosure, to allow access to the connection ports that are located there.
Mount the RTU on centers of 6" x 11-3/8", using the external mounting ears on the enclosure. #10 or 3/16" bolt sizes are best.

Alternatively, the RTU may be mounted in a standard 10" x 12" x 6" NEMA 12, 4 or 4X enclosure. The RTU alternative internal mounting centers of 8-1/4" x 10-1/4" will match the threaded mounting inserts on most such enclosures.

2.2 Physical Dimensions of a RTU

The RTU external dimensions:

- 11.9" High
- 9.8" Wide
- 4.7" Deep

Mounting centers are:

- 6" x 11-3/8"

2.3 Electrical Power Requirements

The product requires power input of one of the following:

- 120 VAC (nominal) 60Hz @ 70 mA maximum current
- DC power input of 8-16 VDC (12 VDC Nominal) input @ 900 mA maximum current
- 48 VDC +/- 10% @ 250 mA maximum current using an optional 48/12 VDC converter module
- 125 VDC +/- 10% @ 125 mA maximum using an optional 125/12 VDC converter module

The currents specified do not reflect initial momentary surge current, which can be several times the above figures.

2.4 Power Wiring

Refer to the diagram RTU INTERIOR VIEW, which indicates where power input connections are to be made.

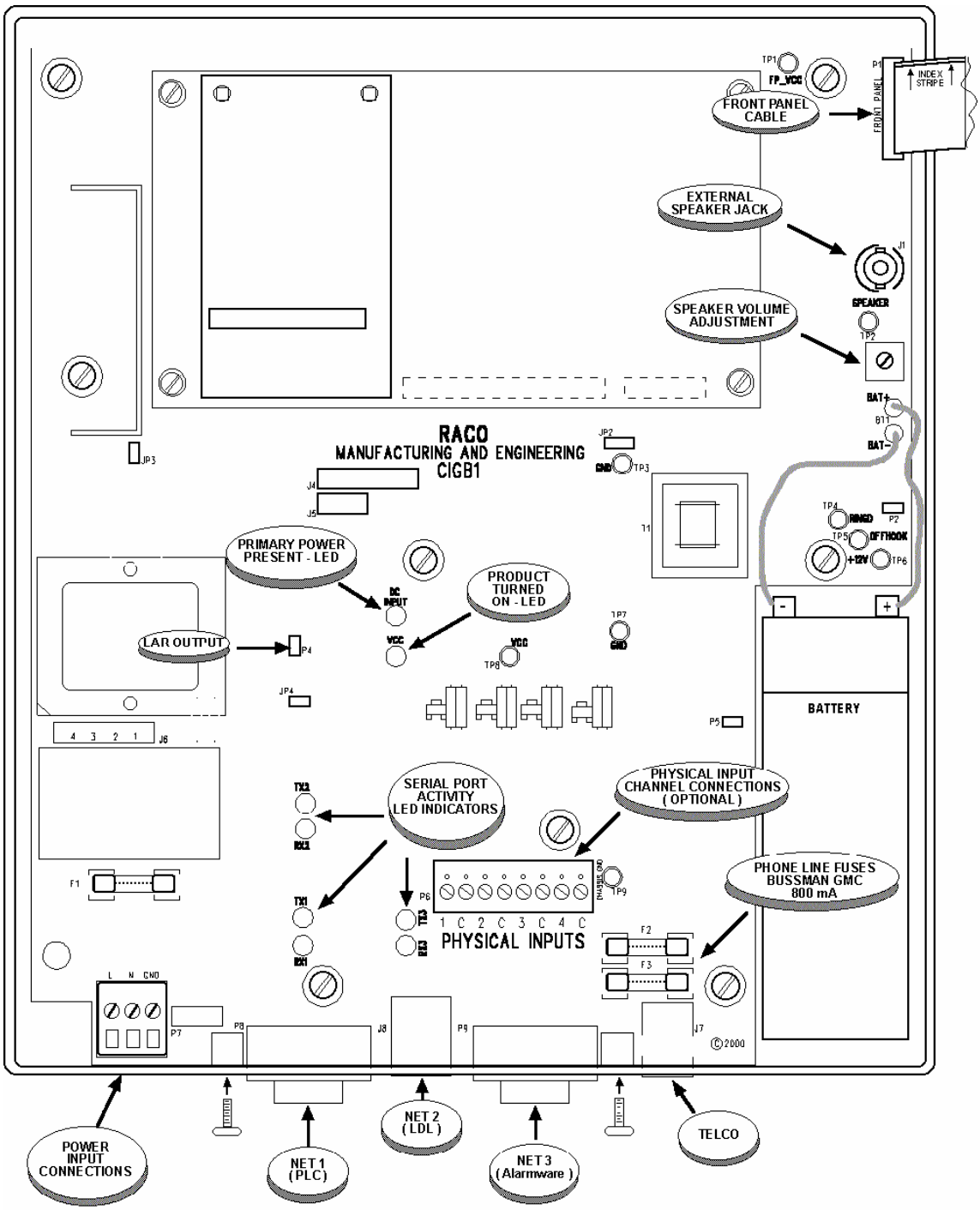
- Inspect and remove any foreign materials that might create short circuits.
- Connect the black (negative) battery lead to the negative terminal on the gel-cell battery. This battery lead was disconnected in preparation for product shipment.
- Most often the product is configured to be powered by 120 VAC and will therefore be shipped with an AC power cord already wired into the unit. This power cord may simply be plugged into a standard grounded 15 Amp.120 VAC outlet. If power to the product needs to be wired via conduit the power cord may be disconnected and removed. The Line, Neutral, and Ground wires should be connected to the TS1 terminal strip at the L, N, and GND, respectively.
- If primary power for the product is 48 or 125 VDC, carefully connect the +, - and ground (earth) leads to Terminal Strip TS1 on the DC/DC Power Converter Module. Be sure that the voltage connected matches with the voltage indicated on the Module's label, and that the +/- polarities are correct.
- If primary power for the product is to be a 12 VDC wall adapter or other 12VDC source the product must be ordered from the factory so configured. (The product needs to be assembled with different primary power components.) Connect the 12 VDC positive lead to the TS1 terminal labeled "L" and the negative lead to the TS1 terminal labeled "GND".
- Regardless of the ultimate source of the 12 VDC power, it is imperative to connect the ground terminal on TS1 to a good electrical ground, in order for the product's substantial built-in surge protection to be effective.

Note: *The act of applying primary power will automatically turn the product on. For the time being, turn it off again by pressing the ON/OFF key on the front panel.*

Important Note: *A good ground (earth) connection is important in order for the substantial electrical surge protection built into the product to work effectively. This ground may be associated with the AC or DC power source, or it may instead be a good ground connection to the grounded chassis of nearby electrical equipment, independent of the AC or DC supply source.*

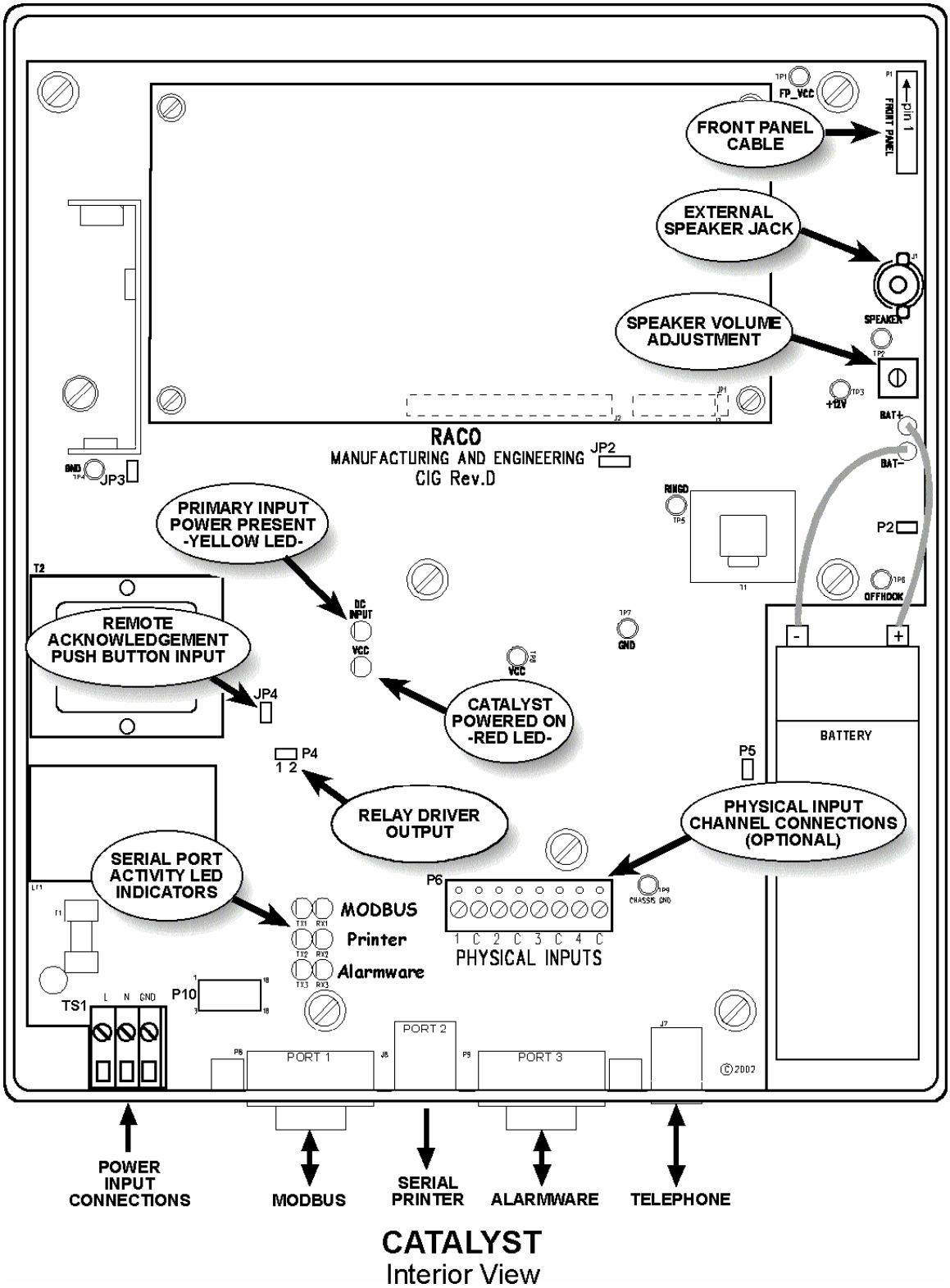
2.5 Catalyst RTU Interior View Diagrams

2.5.1 Rev CIGB1 board

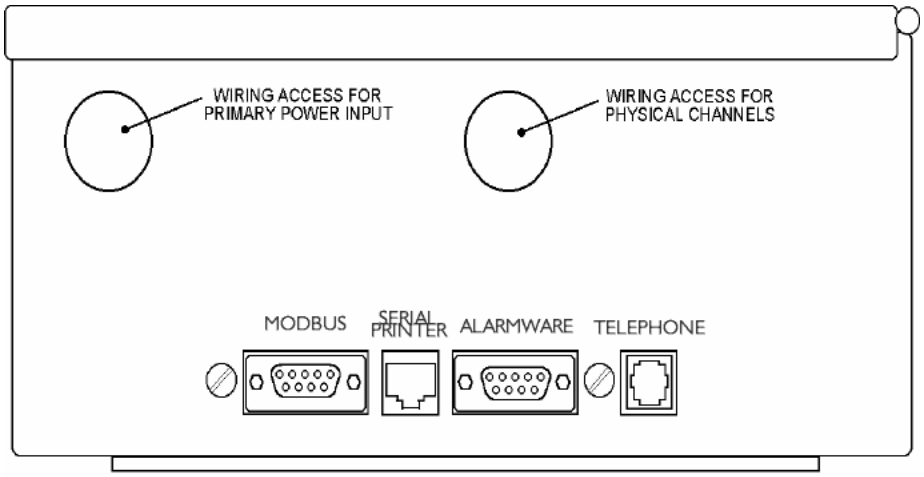


CATALYST
Interior View

2.5.2 Rev CIGD board



2.6 RTU Bottom End View and Connectors



CATALYST
Bottom View

2.7 Telephone Line Connections

Plug a standard RJ11 telephone modular cable into the Telephone Jack located at the bottom end on the right hand side of the product. Plug the opposite end of this cable into an RJ11 telephone line service jack.

Please refer to *the FCC Notice to Users* for details on FCC requirements for use of this product.

2.8 Physical Channel Input Connections

Up to four inputs may be connected directly to the unit. Any such signal inputs will be monitored as **Physical Input** channels, as opposed to **Network Input** channels. These physical input channels are assigned to the first four channel numbers by factory default. However you can change the channel number of the physical input channels, or not assign them any channel numbers, whenever you are configuring the product and depending upon your needs.

The physical channel inputs may be selected to be either analog or digital on an individual channel basis using the Alarmware™ program.

Physical channel inputs are connected to the product at the 8 point Terminal Strip P6, which is located directly above Port 3 and labeled "PHYSICAL INPUTS". Refer to the diagram, *RTU INTERIOR VIEW*. Connect each such signal input to the points marked 1, 2, 3 or 4. Connect each channel's corresponding common ground or signal return to the point immediately to the right of the channel input labeled 'C'.

Terminal strip P6 may be unplugged for access convenience. All terminal points are screw-clamp types, eliminating the need for wire termination lugs. The contact input wire should ideally be light (18 to 24 gauge) signal wire rather than heavy power wire. This reduces problems of bulk and stiffness.

Warning – In all cases, be sure that the contact inputs do not provide power of their own or the product will be damaged!

Exception – If your inputs are coming from a logic controller the TTL, CMOS or 5 VDC logic outputs, direct connection may be made as long as the controller has the same electrical ground as the product. See the discussion below.

2.8.1 Connecting Non-Powered ("DRY") Contact Inputs

Connect non-powered contact inputs as shown in the diagram. Each physical channel has two input connection points. The points marked "C" are internally connected together and to common ground.

Warning – Before making any such connections, verify that there is no electrical power present on the signal wires, otherwise serious damage to the product could result.

2.8.2 Connecting 4-20 mA Analog Signal Inputs

As an alternative to contact inputs or digital logic inputs, you may connect 4-20 mA current loop analog signals to any of the product's four physical inputs. The connections must be made with the correct polarity. For current loop signals this means that the more positive side of the loop must be connected to one of the 'numbered' terminals of P6 (1, 2, 3, or 4) and the return side of the loop must be connected to the input's corresponding 'C' terminal on P6.

2.8.2.1 Floating versus Grounded Current Loops

Note that the negative or 'C' connection points for each of the inputs are connected to each other and to the common ground inside the product. Most 4-20 mA signal circuits "float" with respect to ground. Usually the grounding of the negative or return side of loop circuits will cause no problems. However some 4-20 mA signal circuits already have a connection to ground at some other point in the current loop. If your current loop already has a grounded point in the loop that you cannot remove it is best to install an "isolator". (An example of such an isolator is the Model T700-0000 made by Action Instruments 619-279-5726.) Otherwise, signal errors will be introduced, both for the RTU and for any other elements in the same current loop.

Note that similar devices are available from the above manufacturer (and others) which accept signals in different formats (such as 0-1 VDC, etc.) and translate those signals into standard 4-20 ma signals that the RTU can accept.

The easiest way to verify that there are no grounding problems is to be sure that the current in the loop does not change when the RTU is added to the loop. For example, if there is a chart recorder or readout device in the current loop, first take a reading with the RTU completely disconnected from the loop. Do this by 1) unplugging P6's connector block and 2) temporarily shorting the current loop at that block. (Short the channel's numbered terminal and its corresponding terminal labeled 'C'.) Observe the reading. Then remove the short and reconnect the connector block to include the RTU in the loop. Turn on the

RTU and verify that this does not change the reading on the readout device or chart recorder. Note that all power and ground connections to the RTU must be in place for this test to be valid. Also, the input channel being tested must be programmed for analog input (described elsewhere in this manual).

One cautionary not if you are troubleshooting by making voltage measurements across the signal input connection points on the RTU. Bear in mind that if the product is turned off or if it has not been programmed for analog input, an internal voltage clamp will result in a fixed voltage drop of about 7 VDC seen at the RTU signal input. If the product is turned on and the input has been programmed for analog input, a loop resistance of about 220 ohms will result in a voltage drop of approximately 0.88 VDC with a signal level of 4 ma, and approximately 4.4 VDC with a signal level of 20 ma.

2.8.3 Connecting Digital Logic Signal Inputs

As an alternative to contact inputs you may connect 5-volt logic signals as long as the common electrical ground for the RTU is the same as for the 5 volt logic system. A logic "0" will be interpreted by the RTU as a closed circuit and a logic "1" will be interpreted as an open circuit. If you want to connect higher voltage logic signals (up to 24 VDC) insert a rectifier diode (such as a 1N914, 1N4005, etc.) between the logic signal and the signal input on the RTU. *The diode must be oriented so that the cathode (banded) end is connected to the logic signal.*

2.9 PLC Network Serial Connection

Port 1 is used to allow communication between the product and the PLC. For Modbus PLCs, a standard Modbus serial port cable is needed.

Refer to the *2.13 Cable Diagram* and *2.6 Bottom End Connector View Diagram* included in this section.

2.10 Local Serial Printer Connection

If desired, a serial printer may be connected to the middle serial port (Port 2) using an 8-pin shielded modular connector.

When connected, the serial printer will print activities such as:

- Calls placed to the product.
- Alarm calls placed by the product.
- Which person (via the PIN) acknowledged each alarm.
- As well as any other activity configured to be output to the LDL printer.

Refer to the *2.13 Cable Diagram* and *2.6 Bottom End Connector View Diagram* included in this section.

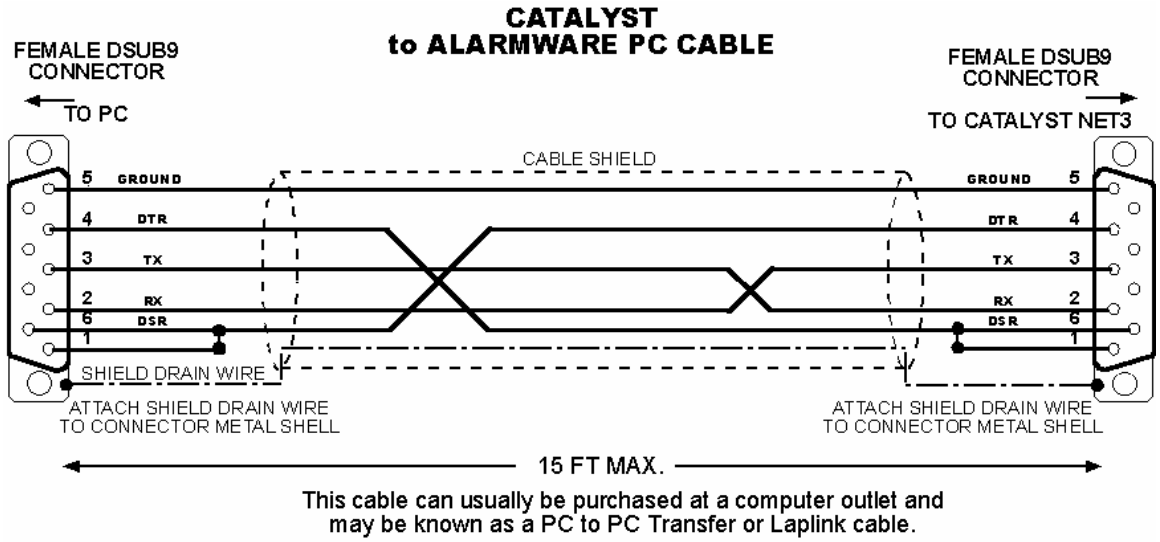
2.11 Alarmware Serial Port Connection

This is for connection of a computer that is running Alarmware™ configuration software. The connection would be made in order to allow transfer of configuration programming, including voice messages, between the product and the portable computer.

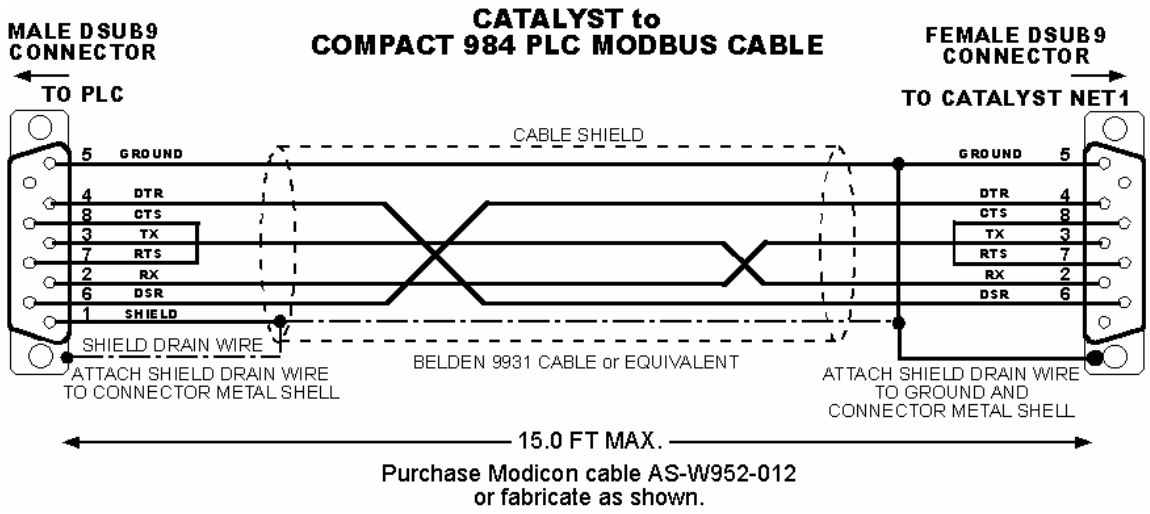
The cable required for this is a generic standard “PC to PC” “Null Modem” serial cable, (sometimes called a Laplink™ cable). The cable has female 9 pin D-Sub connectors on both ends. The connection port on the product is Port 3, the 9-pin connector nearest the Telephone Jack port.

2.12 Cable Diagrams

2.12.1 Catalyst to Alarmware PC Cable



2.12.2 Catalyst to Compact 984 PLC Modbus Cable



2.12.3 Catalyst Local Data Logger Cable