TECHNICAL BULLETIN

Part #: 026-4214 Revision 0 Date: 1/30/2007

CPC®

COMPUTER PROCESS CONTROLS

Clarification of the Operation of Alarm Annunciators in an E2 Control System

Overview

In a site with multiple E2 controllers networked together, one controller may be configured as the **alarm annunciator.** An alarm annunciator gathers advisories reported from other E2s on the network and collects them into a single advisory log. This allows the annunciator to act as the single point of contact for service and store personnel who want to view advisories for all controllers. The annunciator is also the dial-out device, dialing out advisories via modem or TCP/IP to a monitoring center or to a computer running UltraSite.

Because of some features and special situations surrounding the way an alarm annunciator operates, alarm annunciators are often configured incorrectly and may sometimes appear to not work as expected. This technical bulletin describes how an alarm annunciator works, and clarifies which behaviors of an alarm annunciator are normal and which behaviors indicate a possible malfunction.

> *NOTE: The descriptions and instructions in this technical bulletin are based on E2 version 2.40F01. E2 2.40F01 features numerous enhancements and bug fixes that improve annunciation of advisories. It is recommended any site wishing to use alarm annunciators upgrade to the latest E2 version (2.40F01 or above).*

Annunciator and Box-to-Box Network Setup

Multiple E2s are networked together in one of two ways: by Ethernet box-to-box, in which all E2s are part of a local-area network (LAN) or wide-area network (WAN) and are given an IP address; or by Echelon network, in which E2s equipped with Echelon cards are networked together on an Echelon daisy-chain.

The advisory reporting and annunciation process is the same for both Ethernet and Echelon networks:

1. Each controller (including the controller assigned the job of alarm annunciator) has its own advisory log, which collects alarms, notices, and failures for itself and the I/O devices it is associated with.

2. Each controller has its own set of filtering rules it uses to determine whether its advisories should be reported to the annunciator. This is most commonly a priority number setpoint that is checked against the priority level of the advisory, allowing only advisories at or above a certain priority to be reported to the annunciator. By default, filtering is set up so that all advisories are reported to the annunciator.

3. One controller on the network designated as the annunciator reads the advisories reported to the annunciator and adds them to its own advisory log.

4. The annunciator uses its own filtering rules to determine whether the advisories it receives from other controllers will change the state of its alarm relay output and the state of the flashing *ALARM* indicator on its front panel screen. If the annunciator has a modem and is set up for dial-out, it also applies its filtering rules to determine whether the advisory will force a dial-out.

Setting Up an Annunciator and Advisory Filtering In a Non-Annunciator

One device per E2 network may be configured as an alarm annunciator. If a modem is being used as the dialout device for the E2 network, the E2 equipped with the modem **must** be designated as the alarm annunciator.

To designate the E2 as an alarm annunciator:

1. Log into the controller via the front panel, using a login of Level 4 or above.

2. Press [Menu] [7] [3] [1] - GENERAL CONTROLLER INFO.

3. In the "General" tab of the General Controller Info setup screens, highlight the field labeled "Alarm Annuc." Press [Y] to set this field to Yes.
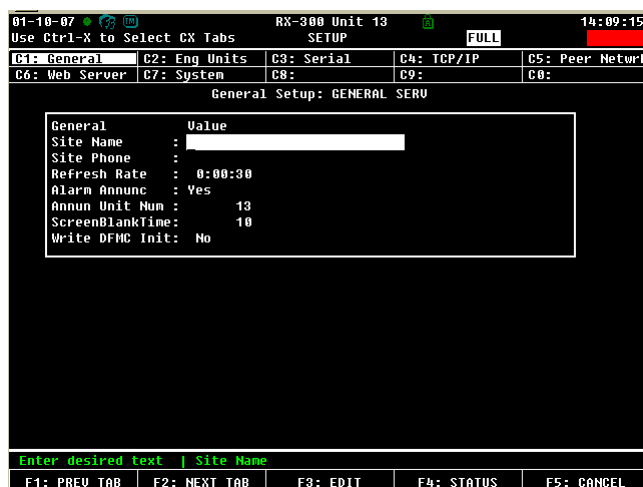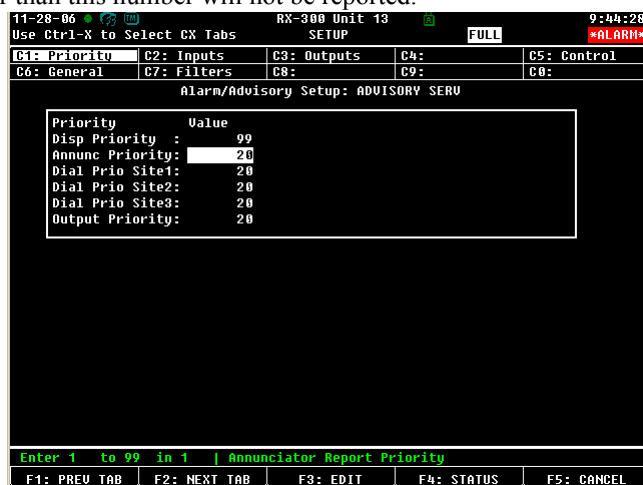

4. The "Annun Unit Num" field specifies which unit number on the network will be the annunciator. For the annunciator and all non-annunciator units, the value of this field is automatically filled with the unit number of the annunciator. It is not necessary to manually enter the annunciator's unit number in this field, but you may do so if you don't want to wait for the unit(s) to automatically discover it.

5. Press [⟵] to save changes and exit. The E2 is now ready to receive, display, and dial out other site controller advisories as the alarm annunciator.

For all E2 controllers on the network (except the alarm annunciator itself), advisory filtering must be configured so that advisories of the desired type and priority are reported on the network and received by the alarm annunciator log. The primary filter that determines whether or not an alarm gets reported to an annunciator is called "Annunc Priority" and is configured in the Alarm Filtering setup screens.

1. Log into the controller via the front panel, using a login of Level 4 or above.

2. Press [Menu] [7] [5] [2] - ALARM FILTERING SETUP.

3. In the "Annunc Priority" field, enter the desired priority level filter value. Advisories whose priority numbers are equal to or smaller than this number will be reported to the annunciator, while advisories whose numbers are higher than this number will not be reported.

```
11-28-06  ⬤ 🖳 🖳             RX-300 Unit 13    🖳              9:44:28
Use Ctrl-X to Select CX Tabs          SETUP         FULL        *ALARM*
C1: Priority   C2: Inputs    C3: Outputs    C4:            C5: Control
C6: General    C7: Filters   C8:            C9:            C0:
                      Alarm/Advisory Setup: ADVISORY SERV

        ┌──────────────────────────────────────────────┐
        │ Priority        Value                          │
        │ Disp Priority  :     99                         │
        │ Annunc Priority:     20                         │
        │ Dial Prio Site1:     20                         │
        │ Dial Prio Site2:     20                         │
        │ Dial Prio Site3:     20                         │
        │ Output Priority:     20                         │
        │                                                │
        └──────────────────────────────────────────────┘




        Enter 1   to 99  in 1  | Annunciator Report Priority
        F1: PREV TAB   F2: NEXT TAB    F3: EDIT    F4: STATUS    F5: CANCEL
```

4. Press ⬭ to save changes and exit.

Note that in the unit that is the alarm annunciator, the value of "Annunc Priority" does not affect which advisories from its own advisory log are displayed in the annunciator log (see "The Annunciator Log," below).

Also, note that the default value of "Annunc Priority" is 99, meaning by default all advisories will be reported to the annunciator log.

The Annunciator Log

The annunciator keeps a log of all reported advisories from all E2s on the network, including itself. This log is called the **annunciator log**, and it is always displayed on the annunciator E2 as its home screen. From the home screen of an E2 annunciator, a user may view information about any advisory reported from any E2. The annunciator log also includes every alarm, notice, and failure generated by the E2 annunciator unit **regardless of its own Annunc Priority filter value**. The annunciator does not filter its own advisories when placing them in the annunciator log — it always places them in the annunciator log.

The user may acknowledge, reset, or clear any advisory shown, and the requested action will also be carried out on the E2 the advisory originated from. In other words, if a user clears an advisory from the annunciator log that originated from E2 #3, the advisory will be cleared from both the annunciator log and the advisory log of E2 #3.

The annunciator E2 has a special view that allows you to view only its own advisories, called the **advisory log**. This log keeps all alarms, notices, and failures generated by the annunciator E2's own subsystems. The advisory log has the same content as the annunciator log view, except without all of the advisories reported from other devices.

The fact that the E2 annunciator unit has two different views for advisories can be a bit confusing. A good rule of thumb to follow when viewing advisories on an annunciator is:

- If you want to see all the advisories for the site, press ⬭ (HOME).

- If you just want to see advisories for the unit, press ⬭ (ALARMS).

> *NOTE: A common mistake made by users is to press the ⬭ button on an alarm annunciator whose screen is in "sleep mode" and expect to see the annunciator log. Doing this will show only the unit's advisories, not the entire annunciator log. For annunciators, always press the ⬭ key to awaken a box from "sleep mode" and view the whole annunciator log.*

How Annunciators Gather Advisories

As mentioned previously, non-annunciators use the Annunc Priority filter to determine what advisories get reported to the annunciator. The annunciator's job is to listen on the network for advisories that are being reported from non-annunciators. If the annunciator reads an advisory from the network, it adds the advisory to the annunciator log.

If an non-annunciator reports an advisory to the annunciator and the annunciator is offline or otherwise does not respond, the non-annunciator will continue to send the advisory report three times, with a three-minute pause in between retries. After three unsuccessful retries have been made, the advisory will not be reported again, and the annunciator log will never show that advisory.

Because of this behavior, there may be differences between the annunciator log and the non-annunciator's advisory logs in cases where the annunciator has been offline for a long time or if a new E2 has just been assigned as the annunciator. A "Clear All Advisories" operation on all E2 units is the only way to resolve annunciator synchronization problems.

Time of Reporting

An advisory may take up to 10 minutes between the time the advisory is generated and the time it appears in the annunciator log. However, the advisory that appears in the advisory log will always have the same time & date stamps as the original advisory. In other words, the times shown for all advisories in the annunciator log are the times the advisories occurred, not the times they were reported or received by the annunciator log.

Return to Normals

When an advisory that was reported to an annunciator returns to normal, the advisory status will be changed to reflect this in both the annunciator log and the advisory log of the E2 from which the advisory originated. Return-to-normals operate the same as advisory reports: the originating E2 will attempt to send the update to the annunciator three times with a three-minute pause in

between retries, and if unsuccessful, it will not attempt further. It is therefore possible in an annunciator that has been offline for a long period of time to show advisories as active that are really no longer active.

Acknowledging, Resetting, and Clearing Advisories with Annunciators

An active advisory may be acknowledged, reset, or cleared from either the non-annunciator E2 they originated from or from the alarm annunciator. With a few exceptions, any actions performed on advisories in the non-annunciator's advisory log will be reflected in the annunciator log, and any actions requested in the annunciator log will be performed on the non-annunciator E2.

In order to acknowledge, reset, or clear an alarm, you must be logged into the E2 with an access level high enough to perform the action (usually level 3, although depending on the user access settings the required level may be higher or lower).

Acknowledging Advisories

From the alarm annunciator, any advisories from non-annunciator units may be acknowledged from the annunciator log screen. Likewise, if an advisory has been reported to the alarm annunciator, an acknowledgement from the front panel of a non-annunicator will also cause the advisory to be shown as acknowledged in the alarm annunciator. In either case, the acknowledged advisory will be "silenced" in the E2 from which it originated, and the alarm outputs and flashing *ALARM* icon in the E2 displays of both units will be de-energized (i.e. to their non-alarm state) if the acknowledged advisories were the only ones causing the output(s) to be energized.

Neither the annunciator E2 nor any of the non-annunciators will keep notification of where the advisory acknowledgement originated from.

A "Reset All Advisories" command (`F1` `B`) also works from either the annunicator log or the non-annunciator's advisory log.

Resetting Advisories

Advisories may be reset from either the annunciator log or from the non-annunciator E2 from which the advisory originated. In either case, a reset advisory is marked as reset in both the annunciator log and the non-annunciator E2 log.

Any time one or more advisories are reset, the E2 will write an advisory in the log of the E2 from which the advisory originated, indicating (1) one or more advisories were reset, and (2) where the reset command was issued. The advisory text will show the origin of the reset command:

- **Alarm(s) were reset -** The reset command was issued from the front panel of the E2 that originated the alarm (or from a Terminal Mode user connecting to this unit).

- **Alarm(s) reset from Remote -** The reset command was issued from a user connecting with UltraSite32. A reset command from Terminal Mode does NOT cause this advisory message to occur.

- **Alarm(s) reset from Annun -** The reset command was issued from the front panel of the alarm annunciator (or from a Terminal Mode user connecting to the annunciator).

A "Reset All Advisories" command (`F2` `B`) also works from either the annunicator log or the non-annunciator's advisory log. If a Reset All Advisories is requested from the alarm annunciator,

the "Alarm(s) reset from Annun" notice will only be written once for each non-annunciator E2 that had advisories reset by the operation.

Clearing Advisories

Advisories may be cleared from either the annunciator log or from the non-annunciator E2 from which the advisory originated. In either case, a cleared advisory is erased from both the annunciator log and the non-annunciator E2 log.

Any time one or more advisories are cleared, the E2 will write an advisory in the log of the E2 from which the advisory originated, indicating (1) one or more advisories were cleared, and (2) where the clear command was issued. The advisory text will show the origin of the cleared command:

- **Alarm(s) were cleared -** The clear command was issued from the front panel of the E2 that originated the alarm (or from a Terminal Mode user connecting to this unit).

- **Alarm(s) cleared from Remote -** The clear command was issued from a user connecting with UltraSite32. A clear command from Terminal Mode does NOT cause this advisory message to occur.

- **Alarm(s) cleared from Annun -** The clear command was issued from the front panel of the alarm annunciator (or from a Terminal Mode user connecting to the annunciator).

A "Clear All Advisories" command (`F3` `B` from the annunciator or advisory log) also works from either the annunicator log or the non-annunciator's advisory log. If a Clear All Advisories is requested from the alarm annunciator, the "Alarm(s) cleared/reset from Annun" notice will only be written once for each non-annunciator E2 that had advisories cleared by the operation.

Log Size Limits and Advisory Replacement

Advisory logs in E2 controllers are limited to a maximum of 200 entries. For an E2's own advisory log, this is usually sufficient to keep a reasonable amount of recent advisory data. However, depending on the number of E2s on the network and the frequency at which they report advisories to the annunciator, it is possible the annunciator log may quickly reach its maximum and be forced to drop advisories that occurred not too long ago to make room for brand new advisories.

The annunciator log follows a set of rules to determine which advisories are removed to make room for new advisories when the maximum limit has been reached. These rules are designed to preserve the most important entries in the annunciator log (active alarms and failures, for example) by dropping the less important advisories first.

Whenever the annunciator E2 must place a newly reported advisory into a full annunciator log, it follows these steps in the order listed below. When the old advisory is removed from the annunciator log, the new advisory will be written to the top of the annunciator log. If multiple advisories are being reported, the annunciator log follows the same process with each alarm, processed one at a time.

1. Some advisory types, such as high and low temperature alarms for generic I/O points, can have advisories whose types are failures, alarms, or notices, even though the message is the same. For example, a high case temperature may be programmed to send a notice for temperatures above 0°F, an alarm for temperatures above 10°F, and a failure for temperatures above 20°F. If the new advisory type is a failure and the annunci-

ator log already has an alarm or notice that has the same alarm message and unit/application of origin, the annunciator log will remove the old alarm or notice to make room for the failure.

2. If #1 does not result in a match, look in the annunciator log for the oldest advisory of any type (alarm, notice, or failure) whose status is "return to normal." If a return-to-normal is found, the E2 will remove it to make room for the new advisory.

3. If #2 does not result in a match, look in the annunciator log for the oldest **acknowledged** advisory of any type (alarm, notice, or failure). If an acknowledged advisory is found, the E2 will remove it to make room for the new advisory.

4. If #3 does not result in a match, the E2 will remove the oldest advisory of any type (alarm, notice, or failure) without regard to the advisory's status. <u>This can include high-priority alarms or failures that are still active,</u> in which case they will continue to be active in the non-annunciator the advisory originated from, and it will not be reported again unless reset or cleared from the non-annunciator.

In most cases, the above rules will ensure the annunciator log does not erase active, unacknowledged advisories, unless the advisory is filled with active advisories and the annunciator log has no other choice. This typically will not happen unless the annunciator has been left unattended for a long period of time, and/or the annunciator log is being populated by a large number of E2s with low "Alarm Annunc" priroity filtering thresholds.