DO CRYO CONTROL SYSTEM
AUTODIALER

OVERVIEW:

The DO cryogenic system is controlled by a TI565 - PLC based control system. This allows the system to be unmanned when in steady state operation. System experts will need to be contacted when system parameters exceed normal operating points and reach alarm setpoints. The labwide FIRUS system provides one alarm monitor and communication link. An autodialer provides a second and more flexible alarm monitor and communication link. The autodialer monitors contact points in the control system and after receiving indication of an alarm accesses a list of experts which it calls until it receives an acknowledgement. There are several manufacturers and distributors of autodialer systems. This EN explains the search process the DO cryo group used to find an autodialer system that fit the cryo system's needs and includes information and specs for the unit we chose.

AUTODIALER SEARCH:

The labwide FIRUS system has been the traditional communication link between an unmanned lab system and the experts that must be in contact with the around the clock operation of that system. Normally the FIRUS system is an adequate link. But the FIRUS system's primary function and highest priority is monitoring fire and security alarm systems. Operational alarms are a lower priority and during peak volumes of labwide alarms, ie. during a labwide power outage, operational alarms can be overlooked. For monitoring critical systems a stand alone system, such as an autodialer, provides more dependability and more flexibility.

We looked at units from several autodialer manufacturers. Omega and RACO market units that were judged unacceptable due to limited options. The Seekirk and Kaye Instrument companies have several lines of autodialers. All but one of each companies' units were judged unacceptable. The Seekirk A1800 and the ADAS 3000 were then compared on paper and by demos from manufacturer's representatives at Fermilab. The ADAS 3000 stood out as the most versatile unit. User
programmability, expandability, more standard options and compatibility with pager systems made the ADAS 3000 the first choice.

The Antel Corporation, which reps the ADAS 3000, provided us with a reference to call and ask questions about the autodialer's performance. The ITT Corporation is contracted by the U.S. Air Force to provide and maintain remote alarm monitoring and autodialer equipment at the DEW line radar sites near the Arctic Circle. I spoke with the ITT person in Alaska who is responsible for the system of twelve ADAS 3000s. He told me he is generally pleased with the equipment and finds them very dependable. He has had them online for two years with no problems. His only criticism was an awkwardness when changing input cards that sometimes disrupted performance of cards in adjacent slots. The manufacturer was informed and made improvements. When questioned concerning the digital voice output, he stated that the clarity and pronunciation is very good. He spoke with the person who set up his library of words to assure the correct pronunciation of words, especially unusual technical jargon.

The comparison of the Seekirk A1800 and ADAS 3000 and the general specifications of the ADAS 3000 have been included in this note.
## DØ CRYO AUTODIALER CONTROL SYSTEM COMPARISON

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>SEEKIRK A1800</th>
<th>ADAS SERIES 3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHONE #S</td>
<td>16</td>
<td>8 PRIORITIZED LISTS OF 8</td>
</tr>
<tr>
<td>CONTACT INPUTS</td>
<td>GROUPS OF 8 TO 128</td>
<td>GROUPS OF 8 TO 64</td>
</tr>
<tr>
<td>ANALOG INPUTS</td>
<td>NO</td>
<td>GROUPS OF 8 TO 64</td>
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<tr>
<td>STATUS ONLY INPUTS</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>OUTPUTS</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>DIALING FORMAT</td>
<td>TT OR PULSE</td>
<td>TT OR PULSE</td>
</tr>
<tr>
<td>REMOTE ACCESS FOR STATUS</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>PRINTER PORT</td>
<td>CUSTOM OPTION</td>
<td>OPTION</td>
</tr>
<tr>
<td>RS-232 PORT</td>
<td>CUSTOM OPTION</td>
<td>OPTION</td>
</tr>
<tr>
<td>SPEECH FORM</td>
<td>40 WORD+CUSTOM LIBRARY</td>
<td>300 WORD+CUSTOM LIBRARY</td>
</tr>
<tr>
<td>BATTERY BACKUP</td>
<td>24 HR</td>
<td>8HR</td>
</tr>
<tr>
<td>24-HR CLOCK/DATE</td>
<td>CUSTOM OPTION</td>
<td>YES</td>
</tr>
<tr>
<td>RING COUNT BEFORE ANSWER</td>
<td>CUSTOM OPTION</td>
<td>PROGRAMMABLE 0-99</td>
</tr>
<tr>
<td>MSG REPEAT COUNT</td>
<td>NO</td>
<td>PROGRAMMABLE 1-99</td>
</tr>
<tr>
<td>INTERCALL DELAY</td>
<td>10-15 SEC</td>
<td>PROGRAMMABLE 0-9,999MIN.</td>
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<tr>
<td>BYPASS/RUN DELAY</td>
<td>NO</td>
<td>PROGRAMMABLE 0-99HRS.</td>
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<tr>
<td>ALARM ACKNOWLEDGEMENT</td>
<td>LOCAL OR BY TELEPHONE</td>
<td>LOCAL OR BY TELEPHONE</td>
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<tr>
<td>LOCAL ANNOUNCEMENT</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>ACCESS CODE</td>
<td>FACTORY PROGRAMMED</td>
<td>USER PROGRAMMABLE</td>
</tr>
<tr>
<td>STATION I.D. PHRASE</td>
<td>FACTORY PROGRAMMED</td>
<td>USER PROGRAMMABLE</td>
</tr>
<tr>
<td>ALARM/STATUS MESSAGES</td>
<td>FACTORY PROGRAMMED</td>
<td>USER PROGRAMMABLE</td>
</tr>
<tr>
<td>PAGER COMPATABLE</td>
<td>UNCLEAR</td>
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</table>
The ADAS 3000 is a member of the Automatic Dialing Alarm System family by Acurex Corporation. It combines many of the features found individually on other ADAS products and is ideally suited for applications involving a diverse set of monitoring, control, and notification requirements. With over 35 user programmable functions, the ADAS 3000 can be configured to use as a highly sophisticated monitoring and data acquisition system.

Features
- 35 User Programmable Features
- Computer Digitized Voice
- 64 Channel Input/Output Capacity
- Field Programmable Messages
- Internal 300 Word Vocabulary
- 64 Telephone Number Capacity
- Local or Remote Operation

Operation
The ADAS 3000 continually monitors its inputs. When sensing a change in the status of one of its discrete inputs or when a signal falls outside the specified limits of one of its analog inputs, the system will respond by beginning its notification sequence. This sequence is user programmable and can vary depending on the duration of the alarm, the current time of day, the specific alarm, and the telephone number assigned.

When an alarm notification is required, the ADAS 3000 begins dialing a set of pre-programmed telephone numbers to notify emergency personnel of the alarm condition. Using high quality digitized voice technology, alarm messages are recited over standard telephone lines, radio frequency, or public address.

Using Acurex’s field programmable speech, the user can construct a descriptive message of up to 20 words for each alarm channel. Unique words pertaining to the user’s specific application can be added to the internal library of over 300 words. For use in pager applications, the 3000 can also generate Touch-Tones (DTMF) as part of the alarm message.

Messages can also provide information obtained from several inputs. For example, in the case of a high water alarm, the message could also include the status of the pump as in “High water level at Main Street Pumping Station. The pump is on.”

The internal clock maintains the current time and date status for use in system operations and documentation of alarm conditions by the optional system printer and automatic activation and deactivation of the system.

In addition to operation from the front panel keypad or the keypad of a remote telephone, the ADAS 3000 can be operated from a terminal which can be connected either directly to the ADAS 3000 or through a modem link. The terminal operation is particularly useful for situations where the ADAS 3000 is used for a constantly changing set of applications that require the user to frequently reprogram the ADAS 3000. If the terminal is also the user’s computer, alarm and status data can also be captured by user developed programs for later analysis.
The versatility of the ADAS 3000 provides the user with the capability to program a total of 35 different functions. These functions include:

- Discrete and Analog, 20 words for each input channel
- Station Identification, 20 words
- Control output messages, 20 words each output channel
- Alarm Telephone List Assignment
- Answer Delay (Telephone Ring Count)
- Date and Time of Internal Clock
- Message Repeat Count
- Intercall Delay
- Bypass to Run Delay
- Call Back Acknowledgment Delay
- Selective Calling/Non-Calling Times for Alarm Messages
- Selective Masking of Alarm Channels
- Remote Access Code
- Fault Integration Delay
- Analog and Totalizer Alarm Set Points
- Analog Scaling and Scale Offset
- Momentary Output Contact Closure
- Call Cancel (allows intermittent alarm to continue call-out until acknowledged)

For a complete description of specifications and features, please contact your Acurex Corporation representative and/or consult the ADAS 3000 Product Specification.

User Programmable Features

<table>
<thead>
<tr>
<th>For Each Type of Input/Output You Can Program:</th>
<th>For Every Input You Can Program:</th>
<th>For the System You Can Program:</th>
</tr>
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<tbody>
<tr>
<td>Discrete Input:</td>
<td>Alarm Integration Delay</td>
<td>Access to Phone List</td>
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<tr>
<td>Analog Input:</td>
<td>Alarm Integration Delay</td>
<td>Channel Masking</td>
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<tr>
<td></td>
<td>High Setpoint (ea input)</td>
<td>Message</td>
</tr>
<tr>
<td></td>
<td>Low Setpoint (ea input)</td>
<td>Call Cancel</td>
</tr>
<tr>
<td></td>
<td>Sca ler/Range (ea input)</td>
<td>Call Only During Armed Time</td>
</tr>
<tr>
<td>Discrete Output:</td>
<td>Channel Masking</td>
<td>Status Only</td>
</tr>
<tr>
<td></td>
<td>Message</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Output Pulse Delay</td>
<td></td>
</tr>
</tbody>
</table>

Options

Input/Output

The ADAS 3000 can be equipped with a combination of input and output channels up to a maximum of 64 channels.

Discrete Input
A discrete input is a dry contact that can be considered to be either "normally open" or "normally closed." This status is user selectable for each channel.

Analog Input
The analog input accepts a standard 4-20 mA signaling circuit and can enunciate the reading in engineering units specific to their application. The input range can be divided into equal parts to correlate the measured data to a unit of measure in which the data is to be reported. The data will be expressed in four significant digits. Low and high alarm points can be programmed to cause the call-out sequence to commence when an input falls outside the specified limits. The beginning point of the analog scale and the range offset are also programmable.

Discrete Output
Used in conjunction with the Remote Access or Terminal Interface options you can start or stop equipment, turn switches ON or OFF, and control other activities on equipment from any remote location. During the same call, the ADAS can confirm that the controlled activity has taken place and that the equipment is functioning properly. The outputs will operate in either a pulse or latched mode. The time duration for the pulse mode is programmable.
Communication

Touch-Tone* Dialing Option
Some telephone installations require the use of Touch-tone* or DTMF (Dual Tone, Multi-Frequency) dialing only. In these situations, the addition of a Touch-tone* card gives the ADAS the ability to call out when DTMF tones are required. The Touch-tone* card also gives the system the capability of reaching outside services (i.e., paging systems, etc.).

Radio Interface
This option allows the ADAS 3000 to connect to an external radio transmitter or public address system in addition to telephone lines. This feature is activated by a special code which is programmed as one of the telephone numbers. Once activated, a transmitter is keyed and the alarm message is broadcast over the radio system. This option also includes a momentary contact closure which will operate upon acknowledgment of an alarm.

Remote Access
This Touch-Tone decode option provides the capability to operate the ADAS 3000 from a remote location using the keypad of a standard Touch-tone* telephone. All of the programming, verifying, and control functions can be performed. Activation of the Remote Access is by means of a user programmable access code.

Terminal Interface
In addition to operating the ADAS 3000 from the front panel keypad or the keypad of a remote telephone, the system also can be operated from a terminal or a computer which emulates a terminal. This terminal may be connected either directly to the ADAS 3000 or remotely connected through the modem option.

Printer
The printer provides complete documentation for the location being monitored. Detailed data regarding alarms and call-out alarms and call-out activity is generated. The call-out data includes date, time, telephone numbers called, and acknowledgments received. The printer also records data retrieved during verification of input parameter settings.

Programmable Word List

Alarm, status, and station identification messages are developed using the internal library of over 300 words. User specified vocabulary can be added to the library furthering the ADAS 3000’s ability to accurately describe monitored functions.

<table>
<thead>
<tr>
<th>ZERO</th>
<th>ONE</th>
<th>TWO</th>
<th>THREE</th>
<th>FOUR</th>
<th>FIVE</th>
<th>SIX</th>
<th>SEVEN</th>
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<th>FOURTEEN</th>
<th>FIFTEEN</th>
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<th>SEVENTEEN</th>
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<tr>
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<th>LIQUID</th>
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<th>PERSONNEL</th>
<th>PIPE</th>
<th>PLANT</th>
<th>PLEASE</th>
<th>PLUS</th>
<th>POINT</th>
<th>SELECT</th>
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<th>OIL</th>
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<th>OPERATE</th>
<th>PULL</th>
<th>Q</th>
<th>RAISE</th>
<th>READING</th>
<th>READY</th>
<th>RED</th>
<th>REMOTE</th>
<th>REMOVE</th>
<th>REPAIR</th>
<th>REPEAT</th>
<th>REPORT</th>
<th>REQUIRE</th>
<th>RESERVOR</th>
<th>RIGHT</th>
<th>RING</th>
<th>TO</th>
</tr>
</thead>
</table>

| VOLUME | WATER | WELL | WET | WHEEL | WINTER | WIT | RIGHT | ROAD | OPERATE | OFF | OIL | ON | OPERATE | PULL | Q | RAISE | READING | READY | RED | REMOTE | REMOVE | REPAIR | REPEAT | REPORT | REQUIRE | RESERVOR | RIGHT | RING | TO |
|--------|-------|------|-----|--------|------|---|-------|---------|-------|----|--------|--------|--------|--------|--------|---------|---------|------|------|----|

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<thead>
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<th>Q</th>
<th>RAISE</th>
<th>RANGE</th>
<th>READY</th>
<th>RED</th>
<th>REMOTE</th>
<th>REMOVE</th>
<th>REPAIR</th>
<th>REPEAT</th>
<th>REPORT</th>
<th>REQUIRE</th>
<th>RESERVOR</th>
<th>RIGHT</th>
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<th>TO</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Instant</th>
<th>P</th>
<th>PAGE</th>
<th>PER</th>
<th>PERSONNEL</th>
<th>PIPE</th>
<th>PLANT</th>
<th>PLEASE</th>
<th>PLUS</th>
<th>POINT</th>
<th>SELECT</th>
<th>SERVICE</th>
</tr>
</thead>
</table>

| FOURTEEN | FIFTEEN | SIXTEEN | SEVENTEEN | EIGHTEEN | NINETEEN | TWENTY | ZERO | ONE | TWO | THREE | FOUR | FIVE | SIX | SEVEN | EIGHT | NINE | TEN | ELEVEN | TWELVE | THIRTEEN | FOURTEEN | FIFTEEN | SIXTEEN | SEVENTEEN | EIGHTEEN | NINETEEN | TWENTY |
|----------|---------|----------|-------------|-------------|----------|-------|------|----|-----|-------|------|------|-----|-------|-------|------|-----|----|-----|-------|------|------|-------|------|------|-------|------|-----|----|-----|-------|------|-----|----|
General Specifications

INPUT/OUTPUT CHANNELS

Discrete Input
Increments of 8 channels
Normally closed or normally open state is field selectable

Analog Input
Increments of 8 channels
4-20 mA signaling circuit

Discrete Output
Increments of 4 channels
Normally open

OPERATIONAL

Telephone numbers
64 number capacity (8 lists of 8 numbers each)
1 to 32 digits

Speech
LPC type synthesis
300+ word internal library

Power
110 VAC, 50-60 Hz, 100W maximum
12 VDC Battery backup (internal)
Transient protection exceeds ANSI C37.90a

Telephone Interface
Standard dial up line
RJ11C connector
FCC Registration number G5P-3JK-17141-AL-R
Ringer Equivalence 0.1B
Pulse Dialing (Touch-tone® optional)

Radio Interface
600 ohm balanced audio
Normally open, dry contact closure keying circuit

Physical
Temperature Range, 0 to 55°C
Humidity, 0 to 99% non-condensing
Dimensions 14” H X 16” W X 6” D
Weight, 42 pounds maximum
Enclosure is welded steel, NEMA 12 rating
Other NEMA enclosures optionally available.

*Trademark of American Telephone & Telegraph

Ordering Information

SPEECH OPTIONS
MCV  Male voice, programmable vocabulary
FCV  Female voice, programmable vocabulary

SAMPLE ORDER
The following is a sample order request for an ADAS 3000 with 16 discrete inputs, 8 analog inputs, 4 discrete outputs, remote access, radio interface, female vocabulary, and one user specified vocabulary word.

ADAS 3000 B16/A8/N4/RA/RF/FCV "Getty"

ADAS 3000 is represented by:

ACUREX
AUTODATA
555 Clyde Avenue, P. O. Box 7042
Mountain View, CA 94039
(415) 967-9100
Telex: 34-6391  FAX:(415) 967-7727

Autodata Direct Lines:
Sales/Marketing (415) 964-2941
Customer Service (415) 965-3123

Acurex Autodata Europe
58 rue Pottier
78150 Le Chesnay, France
Phone: (33)(1) 39 55 81 43
Telex: (842) 697202  FAX: (33)(1) 39 55 18 44

DS ADAS 3000 2.5K 7/88
<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>ITEM DESCRIPTION</th>
<th>ESTIMATED UNIT PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ADA 3000/TT/RA (AUTOMATIC DIALING ALARM SYSTEM) with 4-8 CHANNEL INPUT BOARDS</td>
<td>$3,670.00</td>
</tr>
<tr>
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<td></td>
<td>PRINTER WITH CABLE</td>
<td>$520.00</td>
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<tr>
<td></td>
<td>FEMALE VOCABULARY + 2 USER WORDS at 15.00%</td>
<td>$300.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong> $5,550.00</td>
</tr>
</tbody>
</table>

ORDRING CODE: ADA 3000/TT/RA/832/F1/FCV

USER SPECIFIED WORDS: ARGON, BLOWER, CALORIMETER, CHASE, CONDENSER,

CRYOSTAT, Dewar, Duct, Hydraulic, Instrument

LASSER, LOOP, NITROGEN, RELIEF, RESET

SUMP, VACUUM, VAPOR, VAPORIZER, VENTILATION