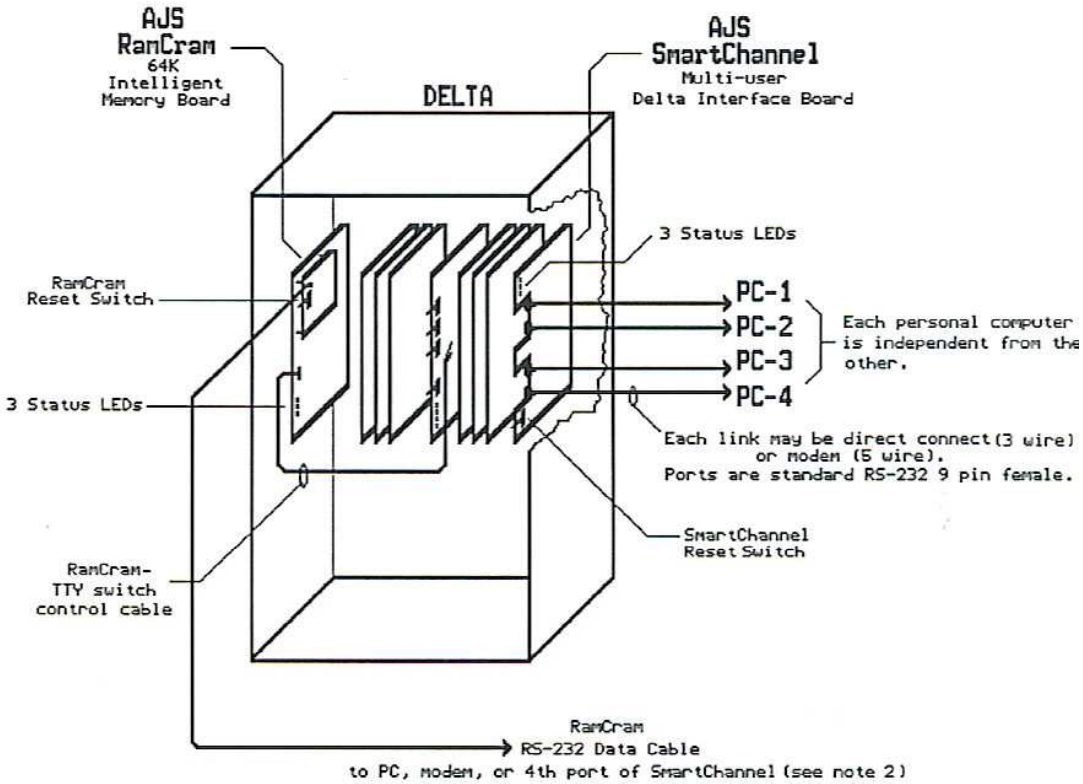
AJS SmartChannel

Users Manual

AJS Technology, Inc. 5071 Running Fox Trail Norcross, GA 30071 (404) 449-1207

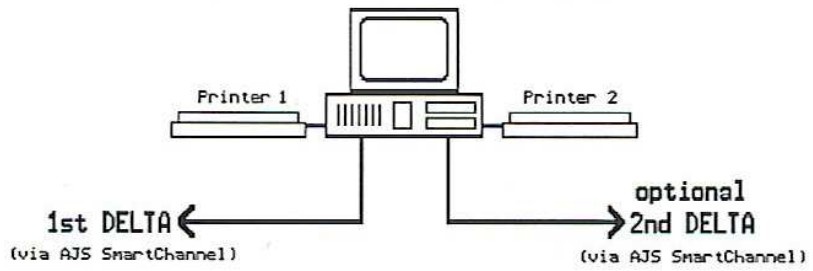
AJS Technology, Inc.

SYSTEM DIAGRAM



TYPICAL PC SETUP

(UP to 4 PCs per SmartChannel)



Notes:

1. The SmartChannel and RamCram are totally separate products and do not require each other for operation.

2. The RamCram RS-232 data cable may be connected to the 4th port of the SmartChannel ("GateWay") allowing authorized users full access to the RamCram. This eliminates the need for a separate data cable between the PC and RamCram for communication.

3. The AJS PC Host Software runs in each PC that is connected to the SmartChannel. Failure of 1 PC does not affect the others.

AJS Technology, Inc. 5071 Running Fox Trail Norcross, GA 30071 (404) 449-1207

TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION

CHAPTER 2 INSTALLATION

CHAPTER 3 OPERATION

CHAPTER 5 PROGRAMMING the AJS SmartChannel

APPENDIX A

Special Notice: Although the information contained in this manual is believed to be accurate at time of printing, AJS Technology reserves the right to make changes without notice.

CHAPTER 1 INTRODUCTION

FEATURE LIST

The following is feature summary of the multi-user **AJS SmartChannel** which allows any PC or terminal to control any Delta 1000* system by providing up to 4 *standard* RS232 interface ports:

- **Plugs directly into any Delta channel slot** for maximum data speed, reliability and ease of installation; does *not* require the AJS RamCram nor the AJS PC Host Software Package for operation
- **Compatible with the AJS PC Host Software Package** for high level operator interface
- **Built-in help tables**
- **Supports up to 4 users** via 4 standard RS232 ports (3 wire for local, 5 wire for modem; 9 pin D-connector)
- **Large buffered storage per user** (up to approximately 3600 change of states); allows each user to go off-line for hours or days and not lose any data from the Delta
- **Independent baud rates** of 300, 1200, 2400, 4800, and 9600 are selectable for each user port
- **Modems are fully supported** by both software and hardware (independent per user port)
- **Remote telephone access** is accomplished by dialing into the SmartChannel via modem
- **Automatic dial-out** on just user critical alarms or all alarms including Delta failure
- **Critical alarm table is independent per user** (up to 52 entries per table)
- **Critical alarm table supports "wildcard" characters** (ex.: 4**** indicates all points on channel 4 are considered critical; 341** indicates any point in group 341 is critical))
- **Telephone number table is dialed once or repeatedly** until answered (up to 5 telephone numbers per table; independent per user)
- **Allows use with digital pagers** where the address of the point causing the dial is displayed on your pager
- **4th user port may be used as a "GateWay" to the RamCram** so that any user connected to the SmartChannel can access the RamCram (data is buffered providing baud rate independence)
- **Cross-connect command** allows any user to temporarily cross connect with a different user port so that telephone numbers, critical alarm points, etc. can be programmed in for that user
- **Emulates standard operator terminals and strip printers** (up to 5 operator terminals and 3 strip printers)
- **Convenient function code entry and display;** user keystrokes are never lost (fully buffered)
- **Standard printer logs:** all point, alarm, and status
- **Password and security level protection**
- **Built in "host computer mode" operation** (handshaking); allows use with **AJS PC Host Software** (see AJS PC Host Software feature list for more information concerning PC operation)
- **Convenient display options** (redump buffers, pause, fast forward, clear buffers)
- **Highly reliable microprocessor technology**
- **Field proven software**
- **Built-in watchdog timer / reset switch**
- **3 status L.E.D.s**
- **Compatible with ALL Delta 1000 revisions** (no modifications)
- **Makes use of existing battery backup** for the Delta
- **User may create a special software application on a** PC and use the SmartChannel as a standard means of getting data from and sending data to the Delta (ex.: custom energy monitoring program or a custom central plant control scheme)
- **2 year warranty** (parts and labor)

GENERAL DISCUSSION

The AJS SmartChannel was developed to meet a variety of needs of Delta 1000 owners. The SmartChannel opens the "window" to Honeywell's system by providing the user with a standard interface to the Delta 1000. Owners now have a choice in the purchase of peripherals with future expandability in mind.

The AJS PC Host Software (available as an option) will allow your PC to become a friendly front end for your Delta 1000 using the AJS SmartChannel. Features include menu penetration (user designed), color display, drives 2 printers, enhanced segregation ability of each printer and display, logs, unlimited chaining of alarm and trouble action messages, operator sign-on / password protection, numerous supervisory functions, hot key window displaying last 50 alarms, historical data option, card access data base management option, live graphics option and many others. With this software, many SmartChannel functions become transparent.

The SmartChannel emulates two Honeywell device types at the same time:

1. Operator's terminal (W1001 or W1006)

2. Strip printer (W1002).

The SmartChannel drives four standard RS232 9-pin ports. The user may provide their own terminal (plain terminal, home computer or even an IBM PC or compatible).

A modem connected to a user port is capable of performing automatic telephone dial-up on either all alarms or user entered critical alarms. A Delta 1000 scan failure can initiate dial-up. The SmartChannel will continue dialing up to 5 different telephone numbers until the user answers and signs on to the system. The SmartChannel is capable of storing alarms until the user signs on at which time the alarms are displayed.

The AJS SmartChannel also contains a rotating buffer that can hold up to approximately 1200 change of states per RAM chip installed (3600 max. with all RAM chips installed). The data is from the Delta is buffered as long as the user is not signed on. In case the buffer overflows, the oldest data is thrown away. This feature allows you to go off-line for extended period of times without losing data.

The AJS SmartChannel is as easy to use as it is to install. It will operate with any existing Delta 1000 regardless of its age or revision. On-line help messages guide the user with examples. Operator password and level table provides security (up to 9 operators).

AJS SmartChannel DISPLAY EXAMPLE

```
OPERATOR #4 SIGNED OFF PORT #1
TELEPHONE HUNG UP PORT #1
40401 AL  OFF013
                        AL404.01      OFF0958
                         R404.01      ON 0959
                           08/22/87   TST1000
40401 AL  OFF013
                        AL404.01      OFF1000
                         R404.01      ON 1003
40401 AL  OFF013
                        AL404.01      OFF1036
                         R404.01      ON 1037
                           08/22/87   TST1100
                           08/22/87   TST1200
                           08/22/87   TST1300
                           08/22/87   TST1400
                           08/22/87   TST1500
20208 50.2DEG013
                        HA202.08  50.2DEG1511
                         R202.08  47.1DEG1514
31203 AL  OFF013
                        AL312.03      OFF1557
                           08/22/87   TST1600
                           08/22/87   TST1700
                           08/22/87   TST1800
                           08/22/87   TST1900
                           08/22/87   TST2000
                           08/22/87   TST2100
22501 AL  ON 013
                        FR225.01      ON 2111
                           08/22/87   TST2200
                           08/22/87   TST2300
                           08/22/87   TST2400
                           08/23/87   TST0100
                           08/23/87   TST0200
                           08/23/87   TST0300
                           08/23/87   TST0400
                           08/23/87   TST0500
```

```
                          08/23/87    TST0600
31401 AL  OFF013
                        FR314.01      OFF0616
20208 49.5DEG013
                        HA202.08  49.5DEG0617

TELEPHONE IN USE PORT #1

OPERATOR #4 SIGNED ON PORT #1
```

CHAPTER 2 INSTALLATION

INSTALLATION QUALIFICATIONS

It is recommended that the AJS SmartChannel should be installed by someone who has at least minimal working knowledge of the Delta 1000. The installation is a relatively simple one.

If this type of person is unavailable at your location, AJS Technology can be made available for a reasonable daily rate plus travel expenses. If this is preferred, the owner will be responsible for running all wiring necessary (from the Delta 1000 to remotely located user PCs as well as have a modular telephone jack if a modem is used). AJS Technology will then come to the job site, terminate, strap, program, and provide training as needed.

INSTALLATION PROCEDURE

First determine the baud rates of each user (4 independent baud rates). Move the associated the jumper blocks (4) to the correct settings (either 300, 1200, 2400, 4800, or 9600 baud). If the PC is located more than 50 to 100 feet then the baud rate should be set to 4800 or lower. Port 1 is the top port while port 4 is the bottom port.

Modems (if used) typically operate at 1200 or 2400 baud.

- Make a Delta 1000 data file back-up using the current saving/loading process (cassette tape, Techtran disk, etc.).
- BE SURE TO TURN O F F THE POWER SUPPLIES FOR THE DELTA.
- Simply pick an unused channel slot and plug in the SmartChannel. ALSO BE SURE THAT YOU ARE INDEED PLUGGING THE SmartChannel INTO A CHANNEL SLOT (furthest right slots). DO NOT PLUG into any other slot.
- BE SURE that the SmartChannel is right-side-up.
- Power up, reload and start the Delta as you normally would.

When power is first applied or the RESET switch on the SmartChannel is toggled up then down, the LEDs on the SmartChannel will go off then the LEDs will turn on indicating various stages of testing of the 32K RAM chips (LEDs count in a binary fashion depending on number of RAM chips). The minimum number of RAM chips is 2 while the maximum number is 4. These are standard 32K x 8 bit static RAM chips.

Plug a PC or terminal into port 1 (top port) of the SmartChannel. Check that the associated baud rate jumper block matches that of the PC or terminal. You should see a question mark (?) each time you hit a key (sign-on prompt). You may sign on to the SmartChannel by entering /#AJS SC <enter>.

DELTA PROGRAMMING

The SmartChannel is set up to look like an operator's terminal at group address 01 and strip printers at group addresses 03 and 04. These groups must be assigned for the channel that the SmartChannel is plugged into. Assuming the SmartChannel is plugged in channel 9 the following example is typical of the assignment process:

```
90100 08      204   assign memory for operators terminal
90100 111111 271   assign full segregation
90300 09      204   assign memory for strip printer #1
90300 111111 261   assign full segregation
```

```
90400 09      204   assign memory for strip printer #2
90400 101111 261   assign full segregation less change of state
```

After doing the above, the top 2 LEDs of the SmartChannel should be blinking rapidly. The blinking of the very top LED is when the Delta is sending data to the SmartChannel and the middle LED is when the SmartChannel is sending data back to the Delta. If it looks like the top LED is blinking more often than the middle LED, you probably have an invalid group assigned to scan on the same channel as the SmartChannel such as a dummy FS20 group. These should be removed to maximize speed between the SmartChannel and the Delta. Ideally only groups 01, 03, 04 should be assigned on that channel.

LED INDICATIONS

The following describes the lights on the SmartChannel during normal operation (NOT DURING INITIALIZATION).

The **top LED** (light emitting diode) indicates that data is being received by the SmartChannel from the Delta (such as a poll or change of state).

The **middle LED** indicates that data is being sent to the Delta from the SmartChannel (such as poll response or command request)

The **bottom LED** indicates that the SmartChannel is sending data to a user PC.

SmartChannel COMMUNICATION PORTS

The SmartChannel has 4 communication ports allowing up to 4 user PCs to tie into the system. Each port is independent from the other (both hardware and software). When data is received from the Delta, it is broadcasted to all users simultaneously.

Communication parameters in your terminal (if a dumb terminal is used as opposed to a PC with AJS Host Software) should be set up for the following:

1 Start bit, 7 data bits, 1 or 2 stop bits, even parity, full duplex.

The typical SmartChannel port pin-out (9 pin D female connector) is as follows:

1 DTR (output) used for input to a modem; causes hang-up when needed

2 TXD (output) transmit data from SmartChannel to user

3 RXD (input) receive data from user to SmartChannel

4 DCD (input) device carrier detect from modem to SmartChannel

5 GND signal ground (common)

Pins 6, 7, 8, and 9 are not used at the SmartChannel.

If a modem is NOT used, only pins 2, 3, and 5 are used.

CABLES

A standard direct connect cable from the SmartChannel to a 25 pin connector at the PC is as follows:

```
9 pin male                    25 pin female (PC end)
----------                    -------------
 TXD 2  - - - - - > - - - - - - 3 RXD
 RXD 3  - - - - - < - - - - - - 2 TXD
 GND 5  - - - - - - - - - - - - 7 GND
```

A standard direct connect cable from the SmartChannel to a 9 pin connector at the PC is as follows:

```
9 pin male                     9 pin female (PC end)
----------                    -------------
 TXD 2  - - - - - > - - - - - - 2 RXD
 RXD 3  - - - - - < - - - - - - 3 TXD
 GND 5  - - - - - - - - - - - - 5 GND
```

A connect cable from the SmartChannel (port 4 - GATEWAY) to the RamCram is as follows:

```
9 pin male                    5 pin connector (1 is top)
----------                    --------------
 TXD 2  - - - - - > - - - - - - 4 RXD
 RXD 3  - - - - - < - - - - - - 2 TXD
 GND 5  - - - - - - - - - - - - 3 GND
```

A standard cable from the SmartChannel to a Hayes modem is as follows:

```
9 pin male                    25 pin male (modem end)
----------                    -----------
 DTR 1  - - - - - > - - - - - - 20 DTR
 TXD 2  - - - - - > - - - - - - 2  RXD
 RXD 3  - - - - - < - - - - - - 3  TXD
 DCD 4  - - - - - < - - - - - - 8  DCD
 GND 5  - - - - - - - - - - - - 7  GND
```

MODEM SETTINGS (if used)

Follow the instructions that accompany the modem for installation and operation. The following is a list of configuration switches within the Hayes modem that should be set to accomplish the following:

- observe DTR (this signal from the SmartChannel forces the modem to hang up if user does not sign on within approximately 1 minute)
- no result codes sent (quiet)
- no echo in command state
- auto answer (if desired)
- enable true status of carrier detect from modem (important)

POWER

The SmartChannel gets its power from the Delta 1000 backplane. Therefore its power is automatically battery backed-up assuming there are existing batteries on the Delta.

NEVER work on the SmartChannel with power applied. Always power down the Delta before plugging or unplugging the SmartChannel.

CHAPTER 3 OPERATION

This chapter discusses the normal operation of the SmartChannel.

If you are using a "dumb" terminal to talk to the SmartChannel, then you must become familiar with this chapter.

If you are using the AJS PC Host Software in your PC, then most of the SmartChannel's functions become transparent. However you must still program the critical point table and telephone table directly.

Because of its many features the best way to learn how to operate SmartChannel is "on-hands" experience. This manual should be able to answer those questions that you will probably come up with after some use.

All operations described in this chapter require at least a level 1 operator. Function code requests require at least levels 2 or 3.

CLEAR KEY (/)

The slash key (/) is used to clear out any operator commands and "start over". For example if you wanted to abort an entry of some sort that you were in the middle of, the slash key will do it. Or if you are trying to sign on but mess up the code and cannot figure out where you are, hitting the slash key will clear it out and start you over.

The slash key will get you out of the "function code mode" as explained later. If you are in doubt, hit slash.

BACKSPACE KEY (or DELETE key on some terminals)

This key allows you to backup one character and correct any mistake. It can be used anytime. A CTL-H will yield the same results.

SIGN-ON (#)

Before you can use the AJS SmartChannel you must go through a sign-on procedure. For example suppose that your 6 character code is APPLES (always 6 characters; no more, no less). Assuming that there is no operator currently signed on, you would go through the following steps:

1. Hit the slash key (/); this clears the SmartChannel.

2. Now hit the pound key (#); this tells the SmartChannel that you want to sign on.

3. Then enter your 6 character code exactly with no unnecessary spaces, commas, etc. You may use the backspace key if a mistake is made.

4. Now you may hit the ENTER key (sometimes called RETURN).

A message should appear stating that you have signed on.

In summary: /#APPLES followed by the ENTER key.

Note that /#apples <ENTER> would not work since the letters are in lower case. The SmartChannel interprets "A" and "a" to be two different characters. It is highly recommended that you push the shift lock key if you have one so that all characters are upper case.

As you properly try to sign on, you will notice that you will not see the characters being entered. This helps keep someone else from seeing your code. You will also notice that if you are not signed on and you try to hit any keys other than the # key initially, question marks will be displayed. When you successfully sign on, the SmartChannel will display a message indicating this fact:

```
OPERATOR #2 SIGNED ON PORT #1
```

SIGN-OFF (!)

If you are leaving the terminal and do not want any unauthorized persons from using it, you should sign-off from the AJS SmartChannel. This is done by simply hitting the exclamation mark key (!). The ENTER key is not needed.

When you successfully sign off, the SmartChannel will display a message indicating this fact:

```
OPERATOR #2 SIGNED OFF PORT #1
```

If you want to sign yourself on, you must first sign off if someone was signed on before you.

HELP KEY (?)

If you forget how to request a log, command a point or whatever, there is a help menu. A simple push of the ? key will cause this menu to be displayed:

```
*** SmartChannel  by  AJS Technology, Inc. (C) Copyright 1985, 1988 ***
      5071 Running Fox Trail, Norcross, GA 30071   (404) 449-1207

/ =CLEAR       ! =SIGN-OFF        #code<cr> =SIGN-ON       . =ACKNOWLEDGE

<CTL-S> =PAUSE DISPLAY     <CTL-C><cr> =JUMP TO END    <CTL-K> =FAST FORWARD
  R<cr> =REDUMP BUFFER           CB<cr> =CLEAR BUFFER
L O G S:   P<cr> =ALL POINT   S<cr> =STATUS   A<cr> =ALARM   Q<cr> =QUIT

<CTL-B> =TOGGLES BEEPER     <CTL-I> =CHANGE PRINTER TABS

      F<cr> =FUNC CODE HELP
<CTL-T><cr> =TELEPHONE TABLE + HELP
<CTL-P><cr> =CRITICAL POINT TABLE + HELP
<CTL-O><cr> =OPERATOR TABLE + HELP

DR<cr> =DIAL REPEAT (until answered)    DO<cr> =DIAL ONCE

CM<cr> =COMPUTER MODE   TM<cr> =TERMINAL MODE
X#<cr> =CONNECT TO ANOTHER USER PORT (where # is port number, X<cr>=finished)
GW<cr> =GATEWAY TO PORT 4 (&=abort)
```

A <CTL-B> for example means that you must hold the CONTROL key downwhile simultaneously hitting the letter B.

Note that where a <cr> symbol follows a letter, this means that you have to hit the ENTER (or sometimes called RETURN or CARRIAGE RETURN) key. Do not hit the % key itself as it has no meaning.

ACKNOWLEDGE KEY (.)

Any time an alarm comes in that needs to be acknowledged, the only thing that has to be done is to hit the period (.) key. Due to "smart" programming in the AJS SmartChannel, you will be returned to what you were doing before the alarm came in. There is no need for example to re-enter that partial line when the alarm occurred.

REQUESTING LOGS: All (P)oint, (S)tatus, (A)larm

To request a log is a very simple procedure. There are 3 types of standard logs available from the Delta 1000: All Point, Status, and Alarm. These logs are exactly the same as those received by Honeywell's W1002 strip printer. Note that only one log can be requested at a time per strip printer address.

Before requesting a log, it is a good idea to hit the / key just in case you are in the function code mode.

To request a log, enter the letter (upper case) then the ENTER key. The following is a table of log commands:

To request an all point log: P then ENTER.

To request a status log: S then ENTER.

To request an alarm log: A then ENTER.

If you want the log to come in on the 2nd strip printer of the SmartChannel (see Chapter 2 - Delta Programming), enter one of the above commands followed by the number 2.

Example: A2 <ENTER> will request an alarm log on strip printer 2.

CANCELLING LOGS: (Q)uit logs

If a log is currently being displayed and you want to stop it then the following is all that is needed:

Enter the letter Q followed by the ENTER key.

If you want to cancel a log that was initiated on strip printer 2, enter Q2 followed by <ENTER> key.

LEVEL 0 FUNCTION CODES (Delta 1000 Commands)

The same commands may be sent by the AJS SmartChannel as those sent by Honeywell's W1001 or W1006 operator's terminal.

You must be at least a level 2 operator to do these codes.

A help menu for level 0 function code commands is available by simply entering the letter F for function code then ENTER. If any character is hit after the F and before the ENTER key is hit, then this menu will not show up. The following menu is what's displayed:

```
*** FUNCTION CODE HELP ***

Fxxx<ENTER>  =FUNCTION CODE REQUEST
    where  xxx  = 3 DIGIT CODE:

 001 =INTCM ON    002 =INTCM OFF
 004 =INCR/OPN    005 =DECR/CLO
 006 =GRAPH ON    007 =GRAPH OFF
 008 =ON/ACCESS   009 =OFF/SECURE
 010 =AUTO        012 =ACKNOWLEDGE
 013 =POINT DATA  014 =TIME
 015 =ALM SUM

T =TAB      / =ABORT
Use  T  for "ADVANCE AND ENTER" codes
```

For example if you want to turn on point 20101, then looking at the previous menu we find the code to be 008. If you have previously entered a function code (other than 008) and are still in the function code mode, you must hit the slash key (/) to clear out the old function code and get out of the function code mode. Now enter F008 then ENTER. The letter F must be upper case like all the other commands.

This puts you in the function code mode with the function code equal to 008. As long as you want to turn points on, you do not have to re-enter the F008.

The SmartChannel will respond with a template that looks like this:

```
12345 123456
```

You may then enter the address under the 12345 similar to that of Honeywell's operator terminal. After entering the address then hit the ENTER key. The SmartChannel will now send your request to the Delta 1000. Then you should see the address echo back indicating that the Delta 1000 received your request:

```
  DISPLAY                    COMMENTS
------------     ------------------------------------------
/                Clear out previous function code mode (if any).
F008             Now you enter F008 then ENTER.

12345 123456     SmartChannel displays template.
20101            You enter the point to be turned on then ENTER.

12345 123456     SmartChannel immediately redisplays template.
20101 OK    008  Delta sends OK message to SmartChannel.
```

You may now enter a new point address to be turned on without re-entering F008. Just enter the new address then ENTER.

Now lets say you want to check if the point actually turned on. First since we are still in the function code mode with function code equal to 008, we must get out of the function code mode by hitting the slash key (/).

Looking at the previous menu we find that the function code for point data is 013. Now you may enter F013 then ENTER. The template (12345 123456) should appear. Then enter 20101 and ENTER. The Delta will respond with the current status of that point. This should look like the following:

```
/                        <---   (arrows indicate your entries)
F013                     <---

12345 123456
20101                    <---

12345 123456
20101 NM ON  013
```

Now since you are in the function code mode with function code equal to 013 you may directly enter the address of another point then ENTER to see its status.

LEVEL 1,2,3 FUNCTION CODES

The method of entering these level function codes is exactly the same as level 0 codes. You must be at least a level 3 operator to do any of these codes.

For example lets change the first and second points of Event Program 001 to 10101 and 90909.

```
/                    <---      (arrows indicate your entry)
F131                 <---

12345 123456
00101 10101          <---

12345 123456
00101 101.01 131
```

```
00102 90909          <---

12345 123456
00102 909.09 131
```

You noticed that you had to enter 00102 to go to the second point in the Event Program. For those of you that are familiar with the advance and enter codes this same procedure can be made a little easier especially if you are entering 30 points instead of just two.

To make use of the advance and enter codes, the T function will be used. This is called the TAB function and is valid only in the function code mode.

TAB KEY (T)

Lets do the same example but this time use the advance and enter code of 133.

```
/                    <---
F131                 <---

12345 123456
00100 10101          <---

12345 123456
00101 101.01 133
                     Now at this point if you hit T, the first 6
                     characters of the last line will be entered
                     automatically as if you typed them in:
00101                <--- done by just hitting the T key

00101 90909          <--- then only enter 90909 and ENTER

12345 123456
00102 909.09 133
```

A little practice will make this a very useful feature. If for example you want to keep updating the status of a particular point once you have its status displayed then all you have to do is hit the T key and ENTER. This saves you from having to re-enter the address over and over.

START/STOP DISPLAY (CTL-S)

When you just sign on and there is a lot of information stored inside the AJS SmartChannel, you may momentarily stop or "freeze" your display by hitting CTL-S (control S). This will give you a chance to read the alarms before they scroll by. You can restart the display by hitting any key (suggest hitting the CTL-S key again).

REDISPLAY BUFFER (R)

If for any reason you would like to redisplay all the information that is stored in the buffer, simply hit R and the ENTER key. The amount of memory installed on the board will determine the maximum amount of information that will be redisplayed.

CANCEL DISPLAY (CTL-C)

If you do not want to wait for the SmartChannel to display its buffer (for example after signing on with many alarms stored in the buffer), then enter CTL-C (control C) and the ENTER key. This will immediately place you at the end of the buffer. Now if any new alarm comes in, you will immediately see it instead of having to wait for the stored information to be displayed first.

SKIP DISPLAY LINE - "fast forward display" (CTL-K)

Suppose that you have requested the R command (redisplay buffer). Now suppose that you would like to "speed-up" the display by skipping many lines of data. By hitting CTL-K (control K), you will cause the SmartChannel to skip over the line that it is currently displaying.

Hitting several CTL-K's will give the same effect as fast forwarding a cassette tape in order to find the information of interest quicker.

The R command, on the other hand, is analogous to an instant rewind and play on a cassette recorder.

NOTES:

CHAPTER 4 PROGRAMMING THE AJS SmartChannel

This chapter discusses the programming aspects of the SmartChannel. All functions described in this chapter require that you be a level 4 operator with the exception of the printer tab function (CTL-I) which only requires a level 1 or higher.

GENERAL OPERATION

The AJS SmartChannel is very similar in operation with the older AJS SmartBoard. Most functions are independent per user. However when the Delta sends any data to the SmartChannel, it broadcasts this data to ALL user ports.

OPERATOR TABLE : one COMMON table for all 4 users

CRITICAL POINT TABLE : one PER USER

TELEPHONE TABLE : one PER USER

Since each user is independent, it is possible to tie in, for example, 2 modems and program each user port to dial out on DIFFERENT types of alarms. An example would be to call the mechanic on automation alarms on one modem and call the security office on security alarms on the other modem.

TERMINAL MODE (TM) / COMPUTER MODE (CM)

The SmartChannel initializes itself in the terminal mode which allows normal operation with a "dumb" terminal. The TM command followed by the ENTER key also forces the SmartChannel into terminal mode (host is "dumb" terminal).

When the SmartChannel is connected to a PC that is running the AJS PC Host Software, it must be set to the computer mode of operation by entering CM followed by ENTER (host is PC running AJS PC Host Software).

When in this mode, a CTL-F (ACK) requests the next record buffered in the SmartChannel to be sent. A CTL-U (NAK) requests that the previous record be retransmitted.

This setting is independent per user port.

CROSS CONNECT (Xn)

A very useful feature of the SmartChannel is the ability to "CROSS-CONNECT" to a different user port. Lets say that you want to program port 3 which has a modem connected to it to dial on certain alarms. Normally you would have to call into this port via the modem and then enter the dial parameters. An easier way (assuming that you are physically connected to a different port) is to "CROSS-CONNECT" to port 3 by entering X3 . This is just like unplugging your connector at the SmartChannel from your port and swapping plugs with port 3. You may now make any changes affecting user port 3. When finished, simply type X and all the ports are returned back to normal.

ADDING / CHANGING OPERATOR CODES AND LEVELS (CTL-O)

There is a help menu and operator table listing available by simply entering a CTL-O then ENTER. Below is what is displayed when you do this:

```
OPERATOR TABLE...<ENTER> FOR HELP


OPERATOR TABLE + HELP...
O=OPER #(1-9)  L=LEVEL(1-4)  C=CODE
Code must be exactly 6 characters long
Ex:  <CTL-O>74ABCDEF<ENTER>  changes
 operator 7 to level 4, code ABCDEF


O L CCCCCC


1 4 AJS SC
2 4 AJS SB
3
4
5
6
7
8
9
```

Notice that there are already two operators preprogrammed into the SmartChannel when it is powered up and reset. This has to be done to allow you to sign on for the first time. You may change the original operators to something else after initial sign-on.

There are a maximum of 9 operators. Each operator can be assigned a level from 1 to 4. The following table explains the difference between operator levels:

Level 1 allows acknowledge of alarms, printer log requests, display control such as pause, redisplay, cancel display, and skip line

Level 2 allows the above + level 0 function codes (commands).

Level 3 allows the above + all function codes.

Level 4 allows the above + operator table, telephone table, and critical point table changes, buffer commands, baud rate changes, terminal mode, computer mode, dial once, dial repeat.

The example listed in the previous help menu shows how to change operator number 7 to a level 4 with a code of ABCDEF. As stated in help menu the code must be exactly 6 characters long. Any character or number can be used.

When you enter CTL-O (by holding the CONTROL key down and hitting the letter O at the same time) you will see the following message:

OPERATOR TABLE... < ENTER > FOR HELP

At this time if you hit ENTER, the previous help menu will be displayed. But if you enter 74ABCDEF (for example) and ENTER then operator 7 will change to level 4 with a code of ABCDEF. A DONE message will then be displayed.

PROGRAMMING THE AUTOMATIC TELEPHONE DIALER (CTL-T)

Similar to the operator table, a help menu for the telephone table can be displayed by simply entering a CTL-T (control T) then ENTER. The following is then displayed:

```
TELEPHONE DIALER...<ENTER> FOR HELP


TELEPHONE TABLE + HELP...
<CTL-T> (FOLLOWING LETTER) <ENTER>
D =(D)ISABLE AUTO-DIAL
A =(A)LL ALARMS DIALED
C =(C)RITICAL ALARMS DIALED ONLY


TO CHANGE TELEPHONE TABLE ENTRY:
<CTL-T> (1-5) (DIAL COMMAND) <ENTER>


Ex: change entry 2 to ATDT9,9368550,,,,,%
    <CTL-T>2ATDT9,9368550,,,,,%<ENTER>
Note that a % symbol is translated to the 5 digit address causing the dial-up.
The % is used with digital pocket pagers (actually displays address of point).
Above example dials 9, waits 2 seconds, dials 9368550, waits 10 seconds for
paging service to answer, then enters actual 5 digit point address.


EX: <CTL-T>2<ENTER>  deletes entry #2


STATUS=> DIALER DISABLED
1
2
3
4
5
```

Notice that the table tells you the current status of the telephone dialer (STATUS = > TELEPHONE DIAL-UP DISABLED). You can see that there is room for up to five telephone numbers. You may add a new number, delete a number, or change a number. Also you may disable the dialer, tell the dialer to dial on all alarms, or to just dial on critical alarms (see later discussion on programming the critical point table).

Let's talk about the dialer and what it can do.

The dialer was designed to automatically dial you at home (or anywhere else) when you wanted to know when a certain alarm occurred. You may be interested in all alarms or perhaps only certain "critical" alarms. The dialer is designed to handle either choice.

When the alarm(s) occur, the dialer will then check if it is disabled. If so then it does nothing. If the dialer is enabled for all alarms then it gets the first number from the telephone able and dials it. If someone does not answer and sign on within approximately one minute, the dialer will then dial the next number in the table. If there is no telephone number programmed in the next entry then it skips that blank entry and checks the next. If it is on the last entry (number

5) it will then start over with the first entry. In other words if you programmed entries 1 and 4 only, then the dialer will automatically try to dial entry 1 then 4 and start over with 1 again if no answer.

NOTE: The dialer is only looking for those alarms that occur on the operator terminal portion of the SmartChannel, not the strip printer. In other words if you segregate the operator terminal portion in the Delta 1000 for no alarms then the dialer will never activate. Strip printer alarms in the SmartChannel do not affect the auto-dialer at all.

This can be used to your advantage. Suppose you want to be called on all HVAC alarms and nothing else. Then the dialer could be told to dial on all alarms (that it receives via the operator terminal portion). Then you could segregate its operator terminal address for the SmartChannel for automation only. Only fire alarms would be received and subsequently dialed upon. All other alarms would still come in via the strip printer portion.

Now you are probably saying, "I don't want to be called every time there is an alarm. I only care if there is a fire alarm or a chiller failure." You would then tell the dialer that you want to be dialed only if there is a critical alarm. Of course you must also tell the SmartChannel what alarms are critical via the critical alarm table (discussed later).

As shown in the help menu, to disable the dialer enter a CTL-T (control T) then the letter D for disable, then hit the ENTER key. A message will verify that you disabled it:

```
TELEPHONE DIAL-UP DISABLED

DONE
```

To enable the dialer to call on all alarms you would enter a CTL-T (control T) then the letter A for all alarms, then hit the ENTER key. A message will verify that you want to be called on all alarms:

```
DIAL ON ALL ALARMS

DONE
```

To enable the dialer to call on critical alarms enter a CTL-T, the letter C for critical alarms, then ENTER. A message will verify that you want to be called on critical alarms only:

```
DIAL ON CRITICAL ALARMS ONLY

DONE
```

Now you should be able to tell the telephone dialer what to do from the previous discussion. However telephone numbers must still be programmed into the telephone table.

If you look at the previous telephone help menu you will see an example of how to enter or change a telephone number entry. The first thing to do is enter a CTL-T which will then show the message previously described:

```
TELEPHONE DIALER...<ENTER FOR HELP>
```

At this point you should enter the single digit number of the entry that you wish to change. Following that single digit should be the dial command then the ENTER key. The dial command is what the modem actually receives from the AJS SmartChannel when its time to dial out. The modem itself is what does the dialing as instructed by the dial command. Although the Hayes modem is capable of many variations, discussion of the dial command will be limited to what will probably be used the most often. You may experiment with different features of the modem by referring to the manual that comes with the modem itself.

As in the help example, all dial commands start with the letters AT. This gets the modem's "attention". The next letter is D for dial. Following the letter D is either the letter P for pulse (similar to the old rotary dial system) or T for touch tone dial. The P or T will depend on whether or not your phone system can handle touch tone dialing.

So far the dial command is either ATDP or ATDT.

Now if your telephone must dial one or two digits to get an outside line, they are entered next followed by a comma. The comma tells the modem to wait a couple of seconds before dialing any more digits. This gives your phone system a chance to get an outside line before any more digits all dialed. Let's assume that a 9 must be dialed to get an outside line and your system is capable of touch tone. Then the dial command up to this point would be the following:

ATDT9, (Attention, dial tone, 9, wait couple of seconds).

Note that all letters in the dial command must be UPPER CASE.

Now you are ready to enter the telephone number itself to be called. For example if the number is 9368550 then you would enter it following the previous command:

ATDT9,9368550

In summary to change telephone number entry 1 to dial the previous

example:

<CTL-T>1ATDT9,9368550 <ENTER>

You may follow the above telephone number with the letter R before you hit ENTER. If this is done, the modem will still dial the number as expected but it will be in the "answer" mode as opposed to the normal "originate" mode when dialing out. This means that you will then hear a tone when you answer the phone on the other end. You would then put your home modem on the other in the "originate" as opposed to the "answer" mode when connecting.

Remember that modems must be in opposite modes (answer/originate) before they will communicate with each other. Refer to the modem manual for more explanation and examples.

To delete a telephone number entry simply enter CTL-T followed by the entry number (1-5) then ENTER. Example:

<CTL-T>1<ENTER> will wipe out entry number 1.

If you are using a home computer or terminal over the telephone, remember that the following communication parameters must be set up in your system in order for proper operation:

300, 1200, 2400, 4800, 9600 baud (baud rate dependent upon type of modems used)

7 data bits

1 or 2 stop bits

Even parity

A feature has been added to allow a person wearing a digital pocket pager to be informed not only if there is a critical alarm (as with the SmartBoard) but also indicate on the pager the actual address of the point that caused the critical dialer to activate. Simply enter the normal dial command in the telephone table but add a few commas after the telephone number then add a % sign at the end. The SmartChannel will then know that you want the 5 digit address of the critical point that went into alarm to be substituted for the % sign. This is very similar to when you enter your phone number after the paging system answers so the person you are paging will know "who" paged him. This is a very powerful and handy feature. See the example in the telephone dialer help table shown in this section.

If the % character is used above and a Delta scan failure initiates the dialer, the address 99900 is substituted.

Modem HINTS:

* If using all 5 wires of the cable (modem to SmartChannel) then be sure that the DTR switch on the modem is set normal (NOT forced true).

* Set switch on modem so that carrier detect is actual (NOT forced true).

* Be sure baud rate jumper on SmartChannel matches the modem's capability.

PRINT PROGRAMS # 253, 254, and 255

Print Programs # 253, 254, and 255 have special meaning to the SmartChannel. If the SmartChannel receives one of these 3 print programs it will perform the following automatically:

```
PP#  SmartChannel Action                        / Equivalent Command
---  ------------------------------------------------------------
253  disables dialer                            /  CTL-T D <ENTER>
254  enable dialer to call on all alarms        /  CTL-T A <ENTER>
255  enable dialer to call on critical alarms   /  CTL-T C <ENTER>
```

This can be very helpful if you want to disable the dialer when you come to work in the morning on a regular schedule so that it does not try to call you at home during a week day. Another reason would be if you are doing regular testing on the Delta system, you could momentarily disable the dialer during the test via software in the Delta.

The print program (253, 254, 255) itself does not have to contain any print items.

DIAL ONCE (DO) / DIAL REPEAT (DR)

When the SmartChannel starts dialing the numbers in the telephone table, you can set the SmartChannel to dial all numbers in the table once or repeatedly. To activate the "dial once" mode, enter DO followed by the ENTER key.

To activate the "dial repeat" mode, enter DR followed by the ENTER key. The dialing will stop when a remote modem answers and a "/" is sent back.

PROGRAMMING THE CRITICAL POINT TABLE (CTL-P)

Remember that the dialer can be told to dial on all alarms or just on critical alarms. If you tell it to dial on just critical alarms only, then you must also tell which alarms are critical and enter their addresses in the critical point table.

Similar to the operator's table and the telephone table, a help menu for the critical point table is available by entering a CTL-P followed by the ENTER key. The following is then displayed:

```
CRITICAL POINT...<ENTER> FOR HELP

CRITICAL POINT TABLE + HELP ( / ABORTS)
EX: <CTL-P>X<ENTER>  lists point X

EX: <CTL-P>X30101<ENTER>  changes X
 to 30101 and advances to next point

* will match any digit ("WILD CARD")
Valid points: A-Z, a-z (total of 52)

A      B      C      D      E
F      G      H      I      J
K      L      M      N      O
P      Q      R      S      T
U      V      W      X10101 Y
Z      a      b      c      d
e      f      g      h      i
j      k      l      m      n
o      p      q      r      s
t201** u4**** v      w      x
y      z
```

As you can see up to 52 different critical point addresses can be entered into the table. At entry X, point address 10101 has been entered. At entries t and u special "wild card" addresses have been entered. The rest of the entries are blank. Point 10101 was entered in the following manner:

You first enter CTL-P (control P) then the upper case letter X, then 10101 and finally the ENTER key.

At this point you could enter another 5 digit address and ENTER and it would automatically get stored in entry Y. In other words the AJS SmartChannel will automatically advance to the next entry and wait for you to enter the next address. If you do not want to change the next entry then just hit the slash (/) key to abort.

Remember that upper case letters are different from lower case letters (A and a) as far as table entry # is concerned.

Suppose an entire Delta group is dedicated to fire alarm and that you want to be dialed on any one of these alarms. Assume that these are four points with addresses 20101, 20102, 20103, and 20104. Since they all start with 201 it would be nice to just be able to tell the telephone table to dial if any alarm in group 201 occurs. There is an easy method for doing this. Instead of enter the four individual addresses in the table, you could enter the following:

```
201**
```

The asterisks following the 201 group address tell the telephone table that if an alarm occurs with the first three digits equal to 201 then it is a critical alarm. In other words the * will match any digit in the position that it is entered in.

Another example is that you want to be called on any alarm that occurs on channel 4 since it is dedicated to fire alarm. Then you would enter the following:

```
4****
```

Note that the two previous examples are shown already entered into the table at entries t and u.

If the Delta 1000 fails to scan the AJS SmartChannel in approximately one minute, an alarm will be generated:

```
DELTA 1000 SCAN FAILURE
```

This alarm is automatically considered a critical alarm and will initiate the dialer if it is enabled to dial on critical alarms or on all alarms.

Important note: to delete a critical point entry, enter exactly 5 spaces instead of the address then ENTER.

BEEPER ENABLE / DISABLE (CTL-B)

When an alarm comes from the Delta 1000 to the AJS SmartChannel via the operator terminal portion of the system, the SmartChannel will display the alarm (if signed on). It will then look at the status of the BEEP flag to determine whether or not to send BEEP characters to your terminal.

To enable or disable this function you must be a level 4 operator. Simply enter a CTL-B (control B). This acts like a toggle and will reverse the previous mode. If the beep mode is disabled and you enter a CTL-B the following message appears:

```
BEEP ENABLED
```

If you hit CTL-B again it will disable it:

```
BEEP DISABLED
```

If the beeper is enabled and an alarm comes in, then by hitting the acknowledge key (.) the beeper will be silenced until the next alarm. Similar to the critical point table, strip printer alarms do not have an effect on the beeper.

If computer mode of operation is enabled, the SmartChannel will not send beep characters to the host computer regardless of the current status of the beeper.

SETTING OF TABS FOR STRIP PRINTER COLUMN (CTL-I)

A tab character is a control character that can be sent by the SmartChannel to your terminal for the purpose of separating the information received by the operator terminal part of the SmartChannel from information received by the strip printer part.

The number of tabs will determine how far the strip printer information is moved to the right of your screen. This will result in a display of two columns with the left displaying operator terminal information and the right displaying strip printer information. This makes it much easier to read.

Your terminal must be capable of receiving tab characters which is a CTL-I from the SmartChannel. Each CTL-I character will cause the printer column to be shifted to the right by 8 spaces (dependent on your terminal).

All you have to do to change the number of tabs desired is enter a CTL-I from your keyboard. This will automatically advance the number of tabs by one and show you the present value:

```
TABS = 1
```

Enter CTL-I again and the following is displayed:

```
TABS = 2
```

Once the number of tabs = 5, then it will start over with 0.

BUFFERING CAPABILITY

Buffering capabilities exist for each user independently. Each user has its own relatively small (1 K) local output buffer where non-critical data such as operator terminal responses and keystroke echoes are stored before outputting (must be signed on first).

A large common rotating MAIN OUTPUT BUFFER stores data coming from strip printers 1 and 2 as well sign-on/sign-off messages, cross connect messages, and telephone in use/hung up messages. Each user port maintains its own pointers to this MAIN OUTPUT BUFFER. When each user port has caught up with its own local output buffer, it then checks to see if new data has arrived in the MAIN OUTPUT BUFFER (relative to that user port). If so, it the outputs that data until it has caught up with the MAIN OUTPUT BUFFER. Each 32K RAM chip on the SmartChannel BEYOND the first one provides about 30K of MAIN OUTPUT BUFFER storage (about 1200 change of states). A maximum total storage of approximately 3600 change of states is possible with all RAM chips installed.

It is possible to redirect the operator terminal responses to the main buffer by altering memory location F800. When the SmartChannel is reset, location F800 is preset to a 06 which is 00000110. It can be changed to 00000111 which is a value of 07:

```
/>F800 <enter> 07 <enter>
```

Note:

bit 0 is operator terminal (Delta address 01 , device 0)
bit 1 is strip printer (Delta address 03 , device 1)
bit 2 is strip printer (Delta address 04 , device 2)
bit 3 is strip printer (Delta address 05 , device 3)
bit 4 is operator terminal (Delta address 11 , device 4)
bit 5 is operator terminal (Delta address 12 , device 5)
bit 6 is operator terminal (Delta address 13 , device 6)
bit 7 is operator terminal (Delta address 14 , device 7)

It is also possible to have only strip printer 1 going to the main buffer which is 00000010 or a value of 2 (this would inhibit print programs which are normally output on strip 2 printer from using up the main buffer):

```
/>F800 <enter> 02 <enter>
```

The method of altering memory locations is the same as the SmartBoard.

GATEWAY MODE (GW)

Another very useful feature of the SmartChannel is the "GATEWAY" mode of operation. This allows you to come in over any port (1,2,3) and connect logically to port 4. Assuming the RamCram is connected via a short cable from port 4 of the SmartChannel, you can then load and save the Delta over the very same communication cable or modem that you normally talk to the SmartChannel with. This saves from having to run a separate cable for the RamCram. To activate this mode just enter GW < enter > for GATEWAY.

Note that while in the GATEWAY mode, communication between the SmartChannel and other user ports is suspended. The Delta is still communicating with the SmartChannel during this period but it should be immediately halted as the SmartChannel ignores it.

When finished, wait about a second then hit the & key. This will terminate the GATEWAY mode.

The user ports may be independently set for any speed as buffering takes place in the SmartChannel. Data, stop bits, and parity are automatically changed from 7 data bits, 2 stop bits, even parity to 8 data bits, 1 stop bit, no parity when in GATEWAY mode and are restored when finished.

NOTES:

APPENDIX A DEVICE ID AND STATUS CODE DESCRIPTION

All records originating from the Delta will be tagged with a 2 digit code at the very end.

The first of the two digits (both operator terminal or strip printer records) stands for the SmartChannel device number (0-7). 0 is normally the operator terminal while 1 and 2 are the strip printers respectively. This lets the host computer know which device the record originated from.

The second digit is different for either the operator terminal or the strip printer as discussed below.

OPERATOR TERMINAL RECORD ENDING DIGIT CODE

Value could be from 0 to 7 depending on following three bits:

Bit 2 = pulse beep Bit 1 = steady beep Bit 0 = flash display

Example: if an alarm came in, the operator terminal will pulse beep and flash display. This results in binary bit pattern 101 which equals 5.

STRIP PRINTER DIGIT ENDING DIGIT CODE

Value ranges from 0 to 3 depending on following two bits:

Bit 1 = beep Bit 0 = red print

Example: if an alarm came in, the strip printer would sound its beeper and print in red ink rather than black ink resulting in a binary bit pattern of 11 which equals 3.

NOTES: