



INSTALLATION INSTRUCTIONS

No. 685
DIGITAL
ALARM RECEIVER

This 7/87 Issue has been substantially revised

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I. GENERAL INFORMATION

The No. 685 Digital Alarm Receiver conforms to Part 68, FCC Regulations, Registration No. AC398U-62851-AL-N, Ringer Equivalence: 0.7B.

This equipment complies with FCC Rules and Regulations Part 15, Subpart J for a Class A computing device. The FCC requires the following statement:

Warning - This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

The No. 685 complies with NFPA Standard No. 71 (National Fire Protection Association, Batterymarch Park, Quincy, MA 02269).

The No. 685 is U.L. Listed for Central Station Burglary and Fire Alarm monitoring.

Important: For U.L. Listed Grade B Central Station and Grade A Police Connect operation, only U.L. Listed digital communicators (such as the Ademco Nos. 678UL-B and 4180-12) can be used at the protected premises. For U.L. 864 Listed fire monitoring, only U.L. Listed digital communicators (such as Ademco No. 678UL-F) can be used at the monitored premises.

U.L. requires that a minimum of two phone lines, on a rotary, be used on the No. 685. While not **required**, it is **recommended** that all Listed accounts transmit in HIGH SPEED format to Nos. 685-2 HIGH SPEED or 685-8 Multi-Format Line Cards (See Section IV B), for the following reasons:

1. All Listed accounts must transmit opening/closing or test signals daily, which can result in delays in processing emergency signals during peak open/close and test periods.
2. The HIGH SPEED format reduces the probability of missing any signal. LOW SPEED format signals (see Section IV A) require approximately 20 seconds between receiver pickup and hangup as compared to approximately 5 seconds for HIGH SPEED format. Assuming two phone lines on rotary and random call-in over a one-hour period, the maximum throughput rate at the receiver is:

HIGH SPEED:	1400	Signals
LOW SPEED:	350	Signals

The receiver is capable of processing signals from digital communicators in LOW SPEED (Ademco Standard, Radionics, or SESCOA) format, Ademco HIGH SPEED format, Radionics BFSK, or Radionics "Superfast" format. The receiver accommodates up to 8 phone lines and processes calls on these lines simultaneously. The type of message (holdup, fire, burglary, etc.) can be displayed and in conjunction with a stand-alone printer (Ademco 786 Printer described herein), a printout with an English language message can be produced. The No. 786 is an 80-column dot-matrix computer style printer.

The receiver is provided with front handles for easy insertion in a standard 19" rack (approximate dimensions are 19" wide x 6-7/8" high x 21" deep). An attractive enclosure (No. 685CX) is optionally available for desk top installation.

The basic No. 685 contains displays, CPU (processor), mother board, power supply and charger and interfaces for printers, modems and a computer. Up to 8 line cards (in any combination) can be installed in the receiver (a separate card is required for each phone line). At the present time, seven types of cards are available:

- No. 685-1 Line Card, Ademco LOW SPEED Format
- No. 685-2 Line Card, Ademco HIGH/LOW SPEED Format
- No. 685-3 Line Card, SESCOA Format
- No. 685-4 Line Card, Radionics Format*
- No. 685-5 Line Card, Ademco Long Range Radio
- No. 685-8 Line Card, Multi-Format*
- No. 685-9 Derived Channel
- No. 685-9AT Derived Channel with ATU included

* Can process Radionics BFSK transmissions.

Each line card contains a telephone line fault monitor. Lightning arrestors are built into the receiver for each phone line.

Standby should be provided by a user-supplied, 12 Volt, maintenance-free, lead acid battery (50 amp-hour minimum). For example, a Globe GC12550 55 amp-hour battery will provide up to 9 hours of standby (U.L. requires at least 4 hours).

Note: Since the No. 685 can process signals on multiple phone lines simultaneously, data is stored in memory and the phone line released prior to the displaying of the signal. "Listen-in", therefore, cannot be used with the No. 685.

The subject receiver is listed for Fire Alarm Signaling service in accordance with UL Standard 864, NFPA Standard No. 71 and is Listed by the California Fire Marshal for commercial fire alarm monitoring. These standards require observance of the following rules:

1. **One spare receiver must be provided for each group of five or fewer primary receivers, with failed receiver maximum substitution time of 30 seconds.**
2. **A minimum of two separate incoming phone lines (numbers) connected to each receiver, with a separate line card for each line, must be provided. All fire alarm monitoring lines must be used for receiving alarm signals only.**
3. **The audible alert of each receiver may not be disconnected or in any manner permanently silenced.**
4. **The loading capability for each receiver shall be in accordance with Table A. The telephone lines shall be arranged in separate hunt groups.**
5. **The 120V electrical connection of the receiver must meet Class 1 wiring requirements. One method of meeting these requirements is shown in diagram 6.**
6. **Ground start may not be used for the premises transmitters.**

TABLE A: RECEIVER LOADING FOR FIRE ALARM MONITORING

RECEIVER LOADING CAPABILITY Lines per Digital Alarm Receiver	1 line	2 lines	3 lines	4 lines	5 lines	6 lines	7 lines	8 lines
A. Protected Premises Equipment	N O T A C C E P T A B L E							
Maximum number of waterflow devices per initiating device circuit:		5	5	5	5	5	5	5
Maximum number of sprinkler supervisory devices per initiating device circuit:		20	20	20	20	20	20	20
Maximum number of all types of initiating device circuits per digital alarm transmitter:		10	10	10	10	10	10	10
When the following limitations are met: 1. A maximum of one waterflow switch per initiating device circuit. 2. A maximum of four sprinkler supervisory switches per initiating device circuit. Then the maximum number of initiating device circuits per digital alarm transmitter is:		50	50	50	50	50	50	50
B. System Loading at the Central Station								
Maximum number of fire protective signaling service initiating device circuits:		2560	3840	5120	6400	7680	8960	10240
Maximum number of digital alarm transmitters for fire protection signaling service:		256	384	512	640	768	896	1024
Maximum number of all types of initiating device circuits in any combination*:		5120	7680	10240	12800	15360	17920	20480
Maximum number of digital alarm transmitters for all types of protective signaling service in any combination*:		512	768	1024	1280	1536	1792	2048

*Includes every initiating device, circuit, i.e.: waterflow, fire alarm, supervisory, guard, burglary, hold-up, etc.

The No. 685 Digital Alarm Receiver, when used in conjunction with a No. 678UL-F Digital Communicator, comprises an FM (Factory Mutual) Approved Digital Alarm Communicator System for Central Station Fire Alarm, Security Alarm and Sprinkler System Supervisory Signaling Services.

The definition of the approved system configuration is summarized herewith.

- . No. 678UL-F Digital Communicator(s) reporting only to a No. 685 Digital Receiver.
- . No. 678UL-F must be programmed only for Alternate by Pairs Calling and 8 Attempts, and communicate in Ademco's High or Low Speed Format.
- . No more than 500 No. 678UL-Fs can communicate to a No. 685 on 2 phone lines. An additional 256 No. 678UL-Fs can be added for each additional phone line.
- . The No. 685's power must be backed up by a 12V, 5AH No. 630 (non-UL use only), or a 12V, 55AH Globe (GC 12550) battery or other more elaborate UPS systems (see Section X, General Specifications, for UL applications).
- . Ground start may not be used for the premises transmitters.

II. PRINCIPAL FEATURES

In addition to those features already mentioned, the receiver's other principal features include:

- A. **Accepts HIGH SPEED transmissions** from Nos. 678, 678UL-B, 678UL-F, 694, 694EN Digital Communicators and Nos. 4160, 4180 Control/Communicators without field modification of units presently transmitting to LOW SPEED receivers.

In HIGH SPEED mode, the time between the start of the handshake tone and the end of the kissoff tone is only 4.7 seconds. During this period, the status of ALL EIGHT of the No. 678's or No. 4180's (or all FOUR of the No. 694's) channels is sent. Other formats require multiple messages for multiple channel reporting.

- B. **Accepts transmissions in LOW SPEED** (Ademco Standard and SESCOA) formats, as well as Radionics "Superfast" format. Three- or four-digit account numbers may be received.
- C. **Accepts 4-2 transmissions** at 10, 20 or 40 pulses per second, using either Ademco (1400 Hz) or SESCOA/Radionics (2300 Hz) Acknowledge and Kissoff tones.
- D. **Can accommodate up to 8 phone lines** and process calls on all lines simultaneously.
- E. **Requires 2 successive identical transmissions for kissoff** (or can accept a single round with a parity check digit).
- F. **Stores up to 113 messages (with new memory board) for subsequent display** during heavy traffic or "trouble" periods.

- G. When 14 messages (with new memory board) have been stored (but not yet displayed) on any one phone line, the next call to that line will receive a "hold" signal (not a "busy" signal) for up to 60 seconds.
- H. Accepts 3- or 4-digit account numbers (with 3-digit account numbers, a leading zero is added) and displays status of 9 channels (including test channel).
- I. Display lights on receiver for burglary, fire, holdup, restore, test, opening, closing, low battery. Triggered by incoming signal if user (or Ademco) programmable option PROM chip is so programmed.
- J. Display lights on receiver indicate AC failure, receiver low battery, telephone line fault, printer failure, computer failure.
- K. English language outputs for printer selectable via user (or Ademco) programmable PROM from built-in table of 27 different messages. Separate tables are used for LOW SPEED (Ademco Standard or SESCOA) format, HIGH SPEED format and Radionics format.
- L. Selectable one- or two-ring pickup, to reduce false pickups caused by noise on phone lines.
- M. One- or two-second delay between pickup and transmission of acknowledge signal, to permit phone line settling.
- N. Displays time in either civilian (11:00PM) or military (23:00) mode and date in either U.S. (MMDDYY) or European (DDMMYY) style.
- O. Monitors phone lines every 10 minutes. If fault occurs, receiver displays faulted line number, prints message and sends special code to computer (if connected). A more immediate test of the phone lines can be accomplished by depressing the SYSTEM TEST switch.
- P. Automatically goes into MANUAL mode in case of printer or A.C. power failure to prevent loss of signals.
- Q. Built-in buzzer will not re-sound after being silenced, if a second alarm is received within 10 seconds of previous alarm.
- R. Dry contact output for remote sounder. Selectable delay of 1 to 50 seconds before contacts close. Cable assembly, with plug, is supplied to facilitate connection.
- S. Manual system test mode tests receiver operation, sends test signals to computer (if connected) and message to printer. Also initiates line test on all inactive phone lines.
- T. Manual battery test reduces charging voltage and produces battery "pass" or "fail" message at printer.
- U. A printed message occurs if receiver is placed in or out of MANUAL mode by an operator.
- V. Optional operation from 50 Hz AC power is programmable (not relevant to UL 864 listed fire alarm monitoring).
- W. Built-in watchdog timer continually monitors receiver operation.

III. FUNCTIONAL DESCRIPTION

A. Switches and LEDs on Front of Receiver

1. **AUTO/MANUAL Switch (and LED).** This pushbutton controls the message display/printing mode. Each time the button is pushed, it switches to an "Out" or "In" position.
 - a. **AUTO (Out) Position:** In the AUTO mode, messages are displayed (and printed) as quickly as they are processed. In this mode, the No. 685 is normally used with a printer, since the display may change rapidly when many messages are being received. This mode permits the No. 685 to operate at maximum throughput.
 - b. **MANUAL (In) Position:** The MANUAL mode is intended for use when a printer is not available and messages are stored in the internal memory of the 685 until the operator chooses to display them. This allows time for the message already being displayed to be copied down manually.

Note: Up to 113 messages can be stored (14 per line card, plus one additional).

The LED located to the left of the AUTO/MANUAL switch is used to indicate that the MANUAL mode is being used. This LED will always be lit when the switch is in the MANUAL (In) position.

There are circumstances in which the No. 685 will switch to the MANUAL mode. These are:

- 1) AUTO/MANUAL switch in MANUAL position, or
- 2) Both PRN-OFF and OFF-COM DIP switches in OFF position, or
- 3) Printer fault with the printer ON, or
- 4) AC power failure with "Auto AC" option (see Section VI B 6) not selected in PROM, or
- 5) Computer failure with OFF-COM DIP switch in COM position and PRN-OFF DIP switch OFF, or
- 6) Computer failure with OFF-COM DIP switch in COM position, MANUAL Mode on Computer Failure option selected and Printer ON.

Note: Operation of the AUTO/MANUAL switch will cause a system message to be generated (See Section IV E 2).

2. **VALID/ALL Switch:** Each time this button is pushed, it switches to an "Out" or "In" position.
 - a. **VALID (Out) Position:** Only messages that are considered "valid" (two successive identical transmissions, or proper parity for single transmission/checksum verified messages) will be printed.

This position may be used to conserve paper, since only one line will be printed for each incoming message. When in the MANUAL mode, this position will also conserve internal message storage space since unverified messages will not be stored.

Two exceptions to this position exist:

1) If no data tones are heard after the "Handshake" tone is sent, a message will be generated as an indication of "no transmission." This is used to indicate the possibility of an attempt to jam the incoming phone line.

2) If a call is handled without a successful message receipt (no kiss-off tone is sent), the last message "round" to be received will be printed, as an indication of a "bad transmission." This feature may be used to help determine the location of a defective communicator.

In both of the above cases, a TRANSMISSION ERROR message will be printed and displayed following the message (See "System Message" Section IV E 2).

- b. **ALL (In) Position:** All incoming transmissions, whether valid or not, will be displayed (and printed).
3. **DISPLAY NEXT MESSAGE Switch:** This momentary action pushbutton is used to cause the next message stored in the memory to be displayed (and printed) when the receiver is in the MANUAL mode. A new message will be displayed for each push of the button until the memory has been emptied, at which time the display will clear. In the AUTO mode, this button functions as the "Clear Display" button.
4. **BATTERY TEST Switch (and LED):** This momentary action pushbutton is used to initiate or cancel a battery test.

The purpose of the battery test is to test the condition of the backup battery.

During a battery test, the No. 685 is operated from the battery alone for a period of 5 minutes. If during that time, the battery voltage falls below the low battery threshold, the test is terminated and a BATTERY TEST FAILURE message will be printed and displayed (See Section IV E 2).

If the battery voltage remains above the low battery threshold (11.2 volts), a BATTERY TEST PASS message will be displayed and printed (See Section IV E 2).

To initiate a battery test: Press and hold the BATTERY TEST button until the LED to the left of it begins to flash (about 2 seconds).

To cancel a battery test, once it has begun: Press and hold the BATTERY TEST button until the LED stops flashing (about 2 seconds).

5. **SYSTEM TEST Switch:** This momentary contact pushbutton is used to initiate a system test. The test is conducted as follows:
 - a. **Hold the button depressed:** All of the front panel LEDs and displays will be turned on to enable user verification of their operation.
 - b. **Release the button:** A SYSTEM TEST message will be sent to all printers, the computer (if used) and the display (See Section IV E 2). This allows a check on all of these devices.
 - c. **Within 10 seconds, all inactive phone lines will be tested** (See Section VIII B 7 c).
6. **SILENCE ALERT SWITCH:** This momentary contact pushbutton is used to silence the receiver's alert tone and also cancel the remote alert (if used...See Section III D 5). If multiple signals come within 10 seconds of each other, the alert will not re-sound.

The volume of the alert tone can be changed by adjusting a potentiometer within the receiver, along its right edge (See Diagram 3).

The alert tone will sound for each of the following conditions:

- a. Each time a message is received.
 - b. Failure or restoral of any of the peripheral devices (printers, computer), battery, or A.C. power.
 - c. Whenever a message remains on the display for more than 30 seconds with the (message) WAITING LED on. This TONE serves to remind the operator that there are more messages stored in the No. 685's memory.
7. **MESSAGE TYPE LEDs:** These 8 display lights can be assigned to specific alarm codes (LOW SPEED Ademco standard, Radionics, and SESCOA formats) and/or channel numbers (HIGH SPEED Ademco, Derived Channel, or Long Range Radio format) by the programming of the option PROM chip furnished with the No. 685. Standardized alarm codes and/or channel numbers must be used for all phone lines (line cards) so programmed. For example, code 1 could mean BURGLAR ALARM for all LOW SPEED communicators. Channel 1 could also mean the same thing, or something different (e.g.: FIRE ALARM), for all HIGH SPEED communicators. For full information, see Section VI A 1. The MESSAGE TYPE LEDs are designated:

HOLD-UP	LOW BATT.
FIRE ALARM	OPENING
BURG. ALARM	CLOSING
RESTORE	TEST

8. **MESSAGE STATUS LEDs:**

- a. **VALID LED:** When lit, indicates that the message on the display is a verified message.
- b. **WAITING LED:** When lit, indicates that at least one message is contained in the internal memory of the No. 685. It is intended to warn the operator that there are more messages to be copied when the MANUAL mode is being used.

As an additional warning feature, the alert tone will be triggered if the DISPLAY NEXT MESSAGE button is not pressed within a 30-second period. If the operator silences the alert but does not display the next message, the alert tone will trigger again 30 seconds later.

This feature is intended to remind the operator that there are more messages stored in the No. 685's memory.

- c. **ACTIVE LED:** When lit, indicates that a call is being processed on at least one of the telephone lines.

9. **SYSTEM FAILURE LEDs:**

- a. **LOW BATT. (BATTERY) LED:** When lit, indicates that the receiver's standby battery voltage has dropped below 11.2 volts. Since the battery is normally being charged by the No. 685, a LOW BATT. condition should only occur after an A.C. power failure.
 - b. **A.C. LED:** When lit, indicates that an A.C. power failure for longer than 5 seconds has taken place.
 - c. **PRINTER LED:** When lit, indicates that one of the printers (serial, parallel or extension) has failed.
 - d. **COMPUTER LED:** When lit, indicates that the No. 685's connection to the computer (if any) has failed.
- Note:** The CAPS and Ademco/MAS computer system are UL listed for burglary monitoring but are not listed for commercial fire monitoring.
- e. **LINE FAULT LED:** When lit, indicates that a failure has been detected in one of the phone lines. The faulty line's number will be displayed above FAULTED LINE just to the right of the TIME and DATE message display.

B. **DIP Switch Group (Inside Front Flip-Down Panel):**

These switches (located inside the flip-down panel on the front of the receiver) are used to select various seldom-changed operating features. They must be activated by straightened paper clip or similar pointed object (not a pencil point). To open the flip-down panel, simply pull on the front handle.

- 1. **AUTO-MA (Auto/Manual Kiss-off) Switch:** This switch is used for factory testing only. Its position is unimportant in normal operation.
- 2. **CRLF-CR (Carriage Return, Line Feed/Carriage Return Only) Switch:** This switch is used to adapt the No. 685 to printers that feed the paper twice when a carriage return-line feed combination signal is received.

When the switch is in the left (CRLF) position, the No. 685 is set up to work with most printers (including the No. 786). If the printing appears double spaced after each line, move the switch to the right (CR). The No. 685 will then output only a carriage return.

3. **PRN-OFF (Printer/Off) Switch:** USE THIS SWITCH IN ITS LEFT (PRN) POSITION WHEN A PRINTER IS USED. If printer failure occurs, the "PRINTER" SYSTEM FAILURE LED will light and the No. 685 will automatically switch to the MANUAL mode. In this event, the MANUAL mode can be overridden, if desired, by moving the switch to the right (OFF). This will return the system to the AUTO mode (as might be desired if a computer is also connected to the No. 685) while keeping track of the printer status. The "PRINTER" SYSTEM FAILURE LED will remain lit.

Caution: While the switch is to the right (OFF), the "ready" lines from the printer are not checked during printing. This could cause loss of data on the printer.

USE THIS SWITCH IN ITS RIGHT (OFF) POSITION IF A COMPUTER IS USED WITH NO RECEIVER PRINTER PRESENT.

With the switch in this position, the No. 685 will automatically switch to the MANUAL mode if a computer failure occurs with no printer connected to the No. 685.

Use of a printer is recommended, to log the details of any "bad transmissions" that may occur.

4. **1S-2S (1-Second/2-Second Handshake Delay) Switch:** This switch is used to select the amount of time allowed for phone line settling after answering a call. In some localities, excessive phone line settling delay might cause the handshake tone to "break up." To avoid this situation, the No. 685 may be programmed to wait a longer time between answering a call and starting the "handshake" tone.

In the left (1S) position, the normal 1-second delay is selected. If difficulties are encountered, moving the switch to the right (2S) will increase the delay to 2 seconds.

5. **12H-24H (12-hour Civilian/24-hour Military Time) Switch:** This switch is used to select a 12-hour (civilian) or 24-hour (military) time display. For the 12-hour display, move the switch to the left (12H) position.

6. **1RG-2RG (1-Ring/2-Ring Pickup) Switch:** This switch is used to program whether the No. 685 will answer a call after 1 ring (left) or 2 rings (right). Pickup after 1 ring should normally be used to allow the No. 685 to operate at maximum speed. If, however, false pickups due to noisy phone lines occur, the 2-ring pickup position should be used.

7. **OFF-COM (Off/Computer) Switch:** This switch is located directly below the 1RG-2RG switch. It may not be labelled on all units.

Use this switch in its right (COM) position when a computer is used.

This switch is used to tell the No. 685 that a computer has been connected to it. The No. 685 uses this information to decide whether or not to switch to the MANUAL mode in the event of a computer failure.

If the "MANUAL Mode on Computer Failure" option has been selected and if the OFF-COM switch is in the right hand position, the No. 685 will switch to the MANUAL mode in the event of a computer failure.

If a printer is present, the No. 685 may be restored to the AUTO Mode by moving the OFF-COM dipswitch to the OFF (left) position.

- C. **Additional Switches (Inside Flip-Down Panel):** The following switches are also to be found inside the flip-down panel on the front of the unit.

1. **RECEIVER NUMBER Selector Switch:** This switch is used to identify the receiver number on message displays and printouts. It may be set to any digit from 1 to 9 (1 for the first receiver, 2 for a second receiver, if used, etc.).
2. **SYSTEM RESET Switch:** This switch is used in case of a temporary malfunction. When this switch is pulled down and released, the following events occur:
 - a. All message memories are cleared.
 - b. The system is re-initialized.
 - c. The stored date and time is checked for validity and reset to 12:00 AM on Jan. 1 if an error is detected. The seconds are always reset to zero.
 - d. A SYSTEM RESET message will be displayed and printed (see Section IV E 2 a).
3. **SEND KISSOFF Switch:** This switch is used for factory testing and does not function in normal operation.
4. **CHANNEL ADVANCE Switch:** This switch is used only for factory testing.
5. **DATE SET/OFF/TIME SET Switch**
6. **MONTH/HOUR Switch**
7. **DAY/MINUTE Switch:**

These switches are used when setting the internal clock and calendar.

Normally the DATE SET/OFF/TIME SET switch is in the OFF position. When it is in either the DATE SET or TIME SET position, the display will flash as a warning and printing is held back (this prevents printout of an invalid time or date during setting of time or date).

At the completion of setting the time or date, a special system message will be generated for logging purposes.

TO SET THE DATE:

- a. Move the DATE SET/OFF/TIME SET switch to DATE SET.
- b. Set the month by pressing and holding the MONTH/HOUR button. The month portion of the display will advance until the button is released.
- c. Set the day by pressing and holding the DAY/MINUTE button until the desired day shows on the display.

Note: The calendar will normally advance from February 28 to March 1. In a leap year, the date may be manually set to February 29. It will then automatically advance to March 1 at midnight.

TO SET THE TIME:

- a. Move the DATE SET/OFF/TIME SET switch to TIME SET.
- b. Press and hold the MONTH/HOUR button until the desired hour is displayed.
- c. Press and hold the DAY/MINUTE switch until the desired minute is displayed.

Note: The seconds counter will be held at 0 seconds until the DATE SET/OFF/TIME SET switch is returned to OFF.

AFTER THE DATE AND TIME HAVE BEEN SET, THE DATE SET/OFF/TIME SET SWITCH MUST BE RETURNED TO "OFF" TO PERMIT MESSAGES TO BE DISPLAYED AND PRINTED.

D. Rear of Receiver:

1. SERIAL PRINTER* Connector J101 (RS232)
2. EXTENSION Printer* (Modem) Connector J102 (RS232)
3. COMPUTER* Connector J103 (RS232)
4. PARALLEL PRINTER Connector J105 (Centronics Format):

*Not relevant to UL 864 listed fire alarm monitoring.

These are standard data connectors (25-pin "D" for J101, J102, J103 and 36-pin for J105) that permit connection to appropriate equipment.

5. **REMOTE ALERT Connector J104:** Permits connecting alert tone dry contacts within the receiver to an optional remote sounder (No. 706 Mini-Howler) or light. Maximum distance between the 685 Receiver and remote sounder or light is 50 feet. A two-conductor cable assembly with matching connector is supplied to facilitate the connection.

Note: An external power source is required for the remote used. The contacts' maximum ratings are: 12V.DC, 2 amps.

Important: Do not use bells or mechanical type horns as sounding devices.

The receiver's remote alert contacts can be operated in either of two modes, as chosen during the programming of the option PROM chip (see Section VI).

- a. **Remote Alert Delay:** The remote contacts' operation follows the receiver's internal alert after a user selectable delay of up to 50 seconds. The remote alert as well as the internal alert will have to be silenced by momentary operation of the receiver's SILENCE ALERT switch. For selecting the delay, see Section VI C on programming the option PROM chip.
- b. **Remote Alert Pulse Relay:** Each time the alert tone is triggered, the remote contacts will close for 2 seconds. This is useful in a computer* installation where the No. 685 is remote from the operator. In this case, mute the No. 685's internal alert using the potentiometer as described in Section III A 6. The operator will then not have to push the SILENCE ALERT button. If 2 seconds of closure is not sufficient, an externally powered latching relay and reset switch can be employed. See Section VI C for selecting the pulse relay option.

*Not relevant to UL 864 listed fire alarm monitoring.

6. **BATTERY 12V Connectors J106, J107:** For connection of user-supplied standby battery (12V, maintenance-free lead acid, 50 amp-hour minimum). Use both cable assemblies provided and parallel the connections at the battery.
7. **TELCO LINES Terminals:** For connection of up to 8 phone lines (phone line polarity must be observed).
8. **AC Power Connector:** For 110V.AC Line Cord (supplied).
9. **AC Fuse:** 3A, SLO-BLO (e.g., No. 90-10).
10. **BATT. Fuse:** 15A (e.g., No. 90-15).
11. **GROUNDING POST:** For connection of an earth ground.

IV. MESSAGE FORMATS

A. LOW SPEED (Ademco Standard, Radionics, Radionics Superfast or SESCOA) Format:

1. **Display, LOW SPEED Format:** When a signal is received via a Line Card installed in the No. 685, the signal will be displayed as six identification digits followed by a single digit alarm code. A typical display might be:

12 0865 2 (plus TIME and DATE)

The first digit (1) represents the receiver number setting of the RECEIVER NUMBER switch on the No. 685 (see Section III C1).

The second digit (2) represents the group or rotary number (1-8) which the user has assigned to the telephone line processing the call. Up to 8 rotary identifiers may be assigned. Conversely, all 8 phone lines may be assigned the same rotary number. This number is programmed during the Line Card Setup Procedure (see Section VII A).

The third through sixth digits (0865) represent the subscriber's account number. The No. 685 Receiver is designed to accept 3- or 4-digit account numbers as supplied by LOW SPEED Ademco, Radionics or SESCOA communicators. When receiving 3-digit LOW SPEED signals, the receiver adds a 0 ahead of the 3-digit account number as shown in this example.

The final digit (2) represents the transmitted alarm code, which can be any code from 0 through 9 or B through F.

With the No. 685 in the AUTOMATIC mode, the characters on the display will appear as they are received and processed by the No. 685. If the second transmission is identical to the first, the display will not change (except for the VALID LED, which will light for the second message). Should the transmission change, the newly transmitted signal will appear on the display screen. In the MANUAL mode, the previous message will remain on the display until the DISPLAY NEXT MESSAGE button is depressed.

If multiple transmissions are received from a communicator, they will normally all be handled by the No. 685 on the same call. Messages are displayed on the No. 685 in succession as if they were separate messages from different communicators.

2. **Printout, LOW SPEED Format:** When a printer is used with the No. 685, it can be operated in one of two modes: PRINT ALL or PRINT VALID ONLY. In the PRINT ALL mode, every message received by the No. 685 will be printed. In the PRINT VALID only successful transmissions which have been kissed-off will be printed. This means, under normal conditions, for every two messages received only one will be printed, in an effort to conserve paper and minimize operator review time. However, when bad or poor transmissions are received, an error message will be printed.

Typical printouts are shown below. Time is represented in an AM/PM basis in this example. The second item represents the month and day of the year. The next 7 digits represent a reproduction of the No. 685 display. The English language message at the right is produced by assigning specific alarm codes to one of 27 messages stored in the option PROM (see Section VI A).

6:30 PM 3/15 12 0865 2 BURGLAR ALARM

If kissoff is issued, the message will be identified as verified with the letter (V) as shown below:

6:30 PM 3/15 12 0865 2 (V) BURGLAR ALARM

Ademco's High Speed communicators will always transmit in LOW SPEED format to the No. 685-1 Line Card.

It is possible that a transmission from a High/Low Speed communicating device may be received by a No. 685-2 or No. 685-8 Line Card in LOW SPEED Ademco Standard format. This will only occur if the communicator fails to recognize the HIGH SPEED acknowledgment tone which is transmitted twice from the No. 685 receiver. This situation can arise as a result of a faulty phone line. The communicator signal will then display on the No. 685 screen and print in exactly the same manner as described above. The only word of caution is that a 4-digit account number programmed into the communicator, will then be transmitted as a 3 digit account number. In this case, the No. 685 will insert a leading 0 to convert the account number into 4 digits. For example, if channel 3 is activated at account 4123, and the call is received by receiver #2 on line #4, this portion of the message will appear as shown below:

24 0123 3

In addition, if a low speed communication message is received on a No. 685-2 HIGH/LOW SPEED card, the message will appear in LOW SPEED Ademco Standard format.

Low speed restoral messages from the Nos. 678, 693*, 694* and similar communicators may optionally be translated to Ademco High Speed format for the CAPS or Ademco/MAS computer system. These messages are as follows:

ACC Z
ACC 9

Where ACC = Account Number
Z = Communicator Channel

These messages will be printed (but not sent to computer) along with a 685-generated High Speed message. The computer will only receive the special High Speed message.

* These Communicators are not UL Listed.

For example, the message: 123 2
123 2
123 9
123 9

will be printed as: 0123 2 (V)
0123 9 (V)
0123 5355 5555 7 (V) ZONE 2 RESTORE

but only
0123 5355 5555 7
will be sent to CAPS.

Note: When the High Speed message is printed, the English language message number will be selected from the HIGH SPEED English language table.

This feature must be enabled for each line card for which it is desired.

B. HIGH SPEED Format:

1. **Display, HIGH SPEED Format:** When a No. 678, 694*, 4160-12, or 4180-12 High Speed Digital Communicator addresses a No. 685-2 HIGH/LOW SPEED Format Line Card, the message will normally be transmitted and displayed in HIGH SPEED format. In this format, the presentation of the six identification digits is similar to that of the LOW SPEED format.

The receiver number, the group or rotary number, and the 4-digit subscriber's account number are the same as described in paragraph A (leading digit is not forced to zero).

Note: The No. 678, 694*, 4160-12 or 4180-12, if programmed for Ademco format, need **not** be re-programmed to send at HIGH SPEED to the No. 685-2 or 685-8 card in the No. 685.

*** Not UL Listed for central station communication**

In HIGH SPEED format, information regarding all 8 channels as well as the ninth (test/low battery/channel data ID) channel will be transmitted on each message. In HIGH SPEED format, alarm **codes** no longer identify a channel. Instead, the **position** of the information in the display and on the printer (if used) identifies the channel. Code numbers identify the **status** of each channel. When any channel is activated in a high speed communicator, status information is automatically transmitted for **all** channels.

The specific code numbers that are used to indicate the status of each channel are indicated in Table B.

For example, if channel 1 is activated, and channel 2 has reported on

(Cont'd on page 20)

TABLE B: CHANNEL STATUS CODES (HIGH SPEED FORMAT)

For the eight event reporting channels (digits 5 through 12), the channel status codes are as follows:

Code	Meaning
1+	NEW EVENT (previously unreported).
2	NEW OPENING (previously unreported).
3	NEW RESTORE (previously unreported).
4	NEW CLOSING (previously unreported).
5	NORMAL (no event since previously reported RESTORE).
6	PREVIOUSLY REPORTED EVENT STILL IN EFFECT.
0*	NEW TROUBLE (only displayed for expanded reporting low speed communicators).

For the ninth channel (digit 13), the following channel status codes are used:

1	DURESS REPORT in previous 8 channels (specifically channel 1).
2	OPENING REPORT in the previous 8 channels (with user ID in channel 1 if expanded reporting of user # is selected at the communicator).
3	ZONE BYPASS STATUS REPORT in the previous 8 channels.
4	CLOSING REPORT in the previous 8 channels (with user ID in channel 1 if expanded reporting of user # is selected at the communicator).
5	ZONE TROUBLE STATUS REPORT in the previous 8 channels.
6	SYSTEM TROUBLE REPORTS in the previous 8 channels. <ul style="list-style-type: none"> CHANNEL 1: AC LOSS CHANNEL 2: LOW BATTERY CHANNEL 3: SYSTEM FAILURE CHANNEL 4: WATCHDOG TIMER RESET (LONG RANGE RADIO) CHANNEL 5: FAILURE TO RECEIVE STATUS MESSAGE (LONG RANGE RADIO) CHANNEL 6: TELCO LINE FAULT CHANNEL 7: NOT USED CHANNEL 8: WALK TEST (SENSOR TEST MODE)
7	ZONE ALARM STATUS REPORT - alarms are reported in previous 8 channels.
8	NEW LOW BATTERY (will not re-report on subsequent calls and will not send restore) - old high speed format method for reporting system low battery - alarm status is reported in the previous 8 channels.
9	TEST REPORT - alarm status is reported in the previous 8 channels.
0	RADIO DIAGNOSTIC** - Radio testing info is reported in previous 8 channels (This message will not be sent to the computer output).

+ This code not used with Radionics BFSK software to report Telco channel problems (code 0 used).

* This code not used for Long Range Radio reporting (code 1 used).

** Refer to Appendix in this manual (see Index) for further information.

a previous transmission, the display will indicate a new alarm (1) on channel 1, a previous alarm (6) on channel 2, normal (5) on channels 3 through 8 and Alarm (7) on the test/low battery/channel data ID channel. The following examples should illustrate the types of displays to be expected with high speed format. In all of the following cases, the receiver number is 1, and the call is received on group or rotary No. 3. Of course, TIME and DATE would be displayed in each case as well.

NOTE: Only NEW events: ALARM, OPENING, RESTORE, CLOSING or TROUBLE on any channel or 24-hour zone BYPASSES or TEST will trigger transmission, at which time all 9 channels will report.

Examples (HIGH SPEED format):

1. At subscriber #2890, channels 1 through 8 are normal and a low battery (channel 9) initiates a call. The following message will be sent:

<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u> <u>1 2 3 4 5 6 7 8 9</u>
Message: 13	2 8 9 0	5 5 5 5 5 5 5 5 8
	Channel 9:	NEW LOW BATTERY

2. At subscriber #5890, channels 2 and 5 go into alarm (and initiate a call) and channel 6, which has previously reported an alarm is still triggered.

<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u> <u>1 2 3 4 5 6 7 8 9</u>
Message: 13	5 8 9 0	5 1 5 5 1 6 5 5 7
	Channel 2:	NEW ALARM
	Channel 5:	NEW ALARM
	Channel 6:	PREVIOUSLY REPORTED ALARM (still in effect)

3. Still at subscriber #5890, following the events of example 2 above, channel 2 restores (initiating the call) and channels 5 and 6 remain in alarm:

<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u> <u>1 2 3 4 5 6 7 8 9</u>
Message: 13	5 8 9 0	5 3 5 5 6 6 5 5 7
	Channel 2:	NEW RESTORE
	Channels 5,6:	PREVIOUSLY REPORTED ALARMS (still in effect)

4. Subscriber #0135 sends an opening:

<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u> <u>1 2 3 4 5 6 7 8 9</u>
Message: 13	0 1 3 5	1 2 2 2 2 2 2 2 2
	Channel 1:	USER ID - User #1 opened
	Channels 2-9:	OPENING REPORT TRANSMITTED

5. After transmission of Example 4, subscriber #0135 sends a closing:

<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u> 1 2 3 4 5 6 7 8 9
Message: 13	0 1 3 5	1 4 4 4 4 4 4 4 4
	Channel 1: USER ID - User #1 closed	
	Channels 2-9: CLOSING REPORT TRANSMITTED	

6. Subscriber #0135 sends a duress message:

<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u> 1 2 3 4 5 6 7 8 9
Message: 13	0 1 3 5	1 5 5 5 5 5 5 5 1
	Channels 1-9: Duress report transmitted	

7. Subscriber #0135, User #1 force arms the system, causing channel 3 to report a bypass.

<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u> 1 2 3 4 5 6 7 8 9
Message: 13	0 1 3 5	1 4 4 4 4 4 4 4 4
		(Closing Report)
13	0 1 3 5	5 5 1 5 5 5 5 5 3
		(Bypass Report)

NOTE: Bypass reports always accompany closing reports when burglary zones are bypassed. If individual zone bypassing had been performed prior to arming, the bypass reports would be sent later when the system was armed and the closing report sent. If a 24-hour zone (e.g., fire, panic) were to be individually bypassed, the bypass report depicted below would be transmitted immediately. The example below shows a bypass report for Channel 5.

<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u> 1 2 3 4 5 6 7 8 9
Message: 13	0 1 3 5	5 5 5 5 1 5 5 5 3

Bypass restorals are **not** transmitted for controlled zones as these zones are known to have been restored when the system is disarmed and the opening report is transmitted. Bypass restorals are transmitted for 24-hour zones, however, when the restoral takes place.

<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u> 1 2 3 4 5 6 7 8 9
Message: 13	5 8 9 0	5 3 5 5 5 5 5 5 3

8. If a trouble condition occurs on channel 2 for subscriber #5890, a trouble report is transmitted.

	<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u>								
			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Message:	13	5 8 9 0	5	1	5	5	5	5	5	5	

Trouble restoral is transmitted as soon as it occurs.

Message:	13	5 8 9 0	5	3	5	5	5	5	5	5	
----------	----	---------	---	---	---	---	---	---	---	---	--

NOTE: If a High Speed trouble report is received on a channel that has been programmed as a FIRE channel (Message #11) the English Language message will be FIRE TROUBLE.

9. If a system trouble condition occurs, a separate trouble message format exists.

	<u>Rcvr/ Line ID</u>	<u>Subscriber Identification</u>	<u>Channel Number</u>								
			<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
For Loss of AC Reporting (Channel 1 is used)											
Message:	13	0 1 3 5	1	5	5	5	5	5	5	6	

For AC Restoral

Message:	13	0 1 3 5	3	5	5	5	5	5	5	6	
----------	----	---------	---	---	---	---	---	---	---	---	--

If the "Low Battery Report in New Format" option has been selected, the battery condition will be reported as follows:

For Low Battery Reporting (Channel 2 is used)

Message:	13	0 1 3 5	5	1	5	5	5	5	5	6	
----------	----	---------	---	---	---	---	---	---	---	---	--

For Low Battery Restoral

Message:	13	0 1 3 5	5	3	5	5	5	5	5	6	
----------	----	---------	---	---	---	---	---	---	---	---	--

It is recommended that the No. 685-2 be dedicated to HIGH SPEED format only. This can be accomplished by cutting the WHITE jumper on the No. 685-2 (see Section VII B). If the jumper is **not** cut, do not exceed 1000 accounts on each No. 685-2 Line Card. This will prevent errors in identifying HIGH SPEED accounts which may transmit at LOW SPEED because of phone line noise.

2. Printout, HIGH SPEED Format:

When a printer is used with the No. 685, it will produce printouts similar to the HIGH SPEED display examples given above. With the line cards' English Language Enable Option in effect, an English language output will be printed as well.

When multiple conditions are reported to the No. 685, at HIGH SPEED, the printer will produce an English language output corresponding only to the **highest** priority level present. By definition, channel 1 is a higher priority than 3, etc.

Conditions which produce an English language output are anything other than a previously reported event or a normal event; however, when multiple conditions occur on one transmission, the printer will produce an (M) in front of the message. Using the same identification numbers as the previous examples and assuming that channels 1 and 3 are activated at 6:30 PM on March 15, and assuming the English language output for channel 1 is HOLD-UP ALARM and the English language output for channel 3 is BURGLAR ALARM, the following message will appear on the printer:

6:30 PM 3/15 13 8531 1515 5555 7 (M) HOLD-UP ALARM

If a transmission received a kissoff from the No. 685 it is designated as a verified message and identified with the letter (V) as shown below:

6:30 PM 3/15 13 8531 1555 5555 7 (V) HOLD-UP ALARM

If a transmission contains multiple alarms and is verified, it is identified by the letters (M) and (V), as shown below:

6:30 PM 3/15 13 8531 1515 5555 7 (M) (V) HOLD-UP ALARM

If the No. 685 is switched to the PRINT VALID position, all messages other than fault messages will contain a (V).

C. Expanded Low Speed Format and Checksum Verification

The No. 685 is capable of receiving expanded low speed reports and Checksum Verified* messages in either the NON-EXPANDED or EXPANDED reporting modes [EXPANDED mode identifies opening and closing by user, trouble and restore by zone (channel) and can also report low battery restore].

- * Decoding of messages with a parity check must be PROM enabled because the receiver needs a way of distinguishing 3-digit subscriber ID/1-digit event with checksum messages from 4-digit subscriber ID/1-digit event messages since they are the same length (see Section VI C).

When a message is received in the NON-EXPANDED reporting mode, the input and output messages will be similar to LOW SPEED format messages (see Section IV A) but will use Radionics alarm codes as indicated in Table C.

In the EXPANDED reporting mode, opening, closing, trouble and restore reports are transmitted using pairs of messages. The first message gives the account number and the type of event (the Radionics alarm code for OPENING is "B", CLOSING is "C", RESTORE is "E" and TROUBLE (and SHUNT) is "F"). The second message will have an "account number" of BBB, CCC, EEE or FFF (OPENING, CLOSING, RESTORE or TROUBLE) and the "alarm code" will indicate the affected channel or user. For example, if a RESTORE occurs on channel 1 at the premises of account 890, the following sequence would be received (assumed RECEIVER No. 1, Group No. 3):

13 0890 E
13 0EEE 1

(Cont'd on page 25)

TABLE C: TYPICAL LOW SPEED MESSAGES

EVENT	INPUT	No. 685's DISPLAY/PRINT OUT	PRINTER OUTPUT (ENGLISH LANGUAGE)	COMPUTER OUTPUT
Regular Reporting Mode:				
Alarm (Zone 1 shown)	124 1	0124 1	(V) ZONE 1 ALARM	0124 1
Opening	124 B	0124 B	(V) OPENING	0124 B
Closing	124 C	0124 C	(V) CLOSING	0124 C
Abort	124 D	0124 D	(V) CANCEL	0124 D
Restore	124 E	0124 E	(V) RESTORE	0124 E
Trouble	124 F	0124 F	(V) TROUBLE	0124 F
Expanded Reporting for Opening, Closing, Trouble & Restore (No. 685 in PRINT ALL Mode);				
Opening (User 3 shown)	124 B BBB 3	0124 B 0BBB 3 0124 3222 2222 2	(V) OPENING - USER #3	0124 3222 2222 2
Closing (User 3 shown)	124 C CCC 3	0124 C 0CCC 3 0124 3444 4444 4	(V) CLOSING - USER #3	0124 3444 4444 4
Restore (Zone 1 shown)	124 E EEE 1	0124 E 0EEE 1 0124 3555 5555 7	(V) (V) (V) ZONE 1 RESTORE	0124 3555 5555 7
Trouble (Zone 2 shown)	124 F FFF 2	0124 F 0FFF 2 0124 5055 5555 7	(V) (V) (V) ZONE 2 TROUBLE	0124 5055 5555 7
Battery Trouble	124 F FFF 9	0124 F 0FFF 9 0124 5555 5555 8	(V) (V) (V) LOW BATTERY	0124 5555 5555 8
Battery Restore	124 E EEE 9	0124 E 0EEE 9 0124 5555 5555 B	(V) LOW BATTERY RESTORE	0124 5555 5555 B
Expanded Reporting for Opening, Closing, Trouble & Restore (No. 685 in PRINT VALID Mode):				
Opening (User 3 shown)	124 B BBB 3	0124 3222 2222 2	(V) OPENING - USER #3	0124 3222 2222 2
Closing (User 3 shown)	124 C CCC3	0124 3444 4444 4	(V) CLOSING - USER #3	0124 3444 4444 4
Restore (Zone 1 shown)	124 E EEE 1	0124 3555 5555 7	(V) ZONE 1 RESTORE	0124 3555 5555 7
Trouble (Zone 1 shown)	124 F FFF 1	0124 0555 5555 7	(V) ZONE 1 RESTORE	0124 0555 5555 7

The No. 685 **combines** these messages and produces an equivalent HIGH SPEED format message to indicate a RESTORE of channel 1 (see Section IV B):

13 0890 3555 5555 7

The combined message will be displayed on the No. 685 and outputted to the printer and computer. In addition, if the No. 685 is in the PRINT ALL mode, the original messages received will precede the combined message on the printer (as well as the 685's display) for reference purposes:

13 0890 E (V)
13 0EEE 1 (V)
13 0890 3555 5555 7 (V)

Table B shows typical Expanded messages. Note the use of code "0" in the equivalent high speed format to indicate a TROUBLE condition for a particular zone (channel) and the use of code "B" for LOW BATTERY RESTORE. ACCOUNT NUMBER 124 is assumed in the typical messages. For brevity, RECEIVER and GROUP numbers are not shown.

The No. 685 Receiver is capable of receiving 4-2 messages on the 685-1, -2, -3, -4 and -8 line cards. A 4-2 message consists of a 4-digit subscriber ID# followed by a 2-digit event code. Usually, the first digit of the event code is used to indicate the type of event, and the second digit of the event code is used to indicate the zone or channel.

The No. 685 will use the first digit of the event code in determining the English Language message to use. For example, if event code 2 is programmed for FIRE and the message 0890 23 is received, the English language output will be:

0890 23 (V) FIRE ZONE 3

Messages which have B, C, E, or F as the first digit of the event code will be interpreted as openings, closings, restores, and troubles, respectively.

In order for 4-2 messages to be output to the computer, some translation of the message may need to be performed. See section XI, (COMPUTER INTERFACE) for additional information.

D. Radionics BFSK

When the No. 685 Receiver is equipped with the Radionics BFSK version software, the following features are incorporated:

1. Accepts BFSK, Sescoa, and Radionics Superfast messages using the No. 685-4 or No. 685-8 Line Card (available separately).
2. Handles the following BFSK reports automatically:
 - a. FIRE
 - b. Openings/Closings by user/zone
 - c. Status Reports
 - d. Force-Arming Reports
 - e. AC Power Failure Reports
 - f. Telco Line Failure/Restoral Reports

- g. POPEX Trouble/Restore Reports
 - h. Telco Communication Channel Trouble Reports
 - i. Unsuccessful and Successful Download, or Power-on Reset Trouble/Restore Reports
3. Translates all received messages into an Ademco Computer Automation System compatible format. In addition, a 'Zone English' message will be printed on the No. 786 Printer, if used.

Make sure that the Ademco computer system (if used) is set up to handle alarm codes S (Status reports) and W (Force-arming) for the BFSK accounts.

Note: Listen-in reports will not be handled automatically.

In all the examples that follow, the receiver number is 1, the call is received on group or rotary No. 3, and the account number is 123 (0123). Of course, TIME and DATE would be displayed and printed in each case as well. Refer to Table B for information on code numbers, channel positions, etc.

Fire Reports: All BFSK messages received with the Radionics FIRE indicator bit set will have the word FIRE inserted on the printer (for example, FIRE TROUBLE ZONE 1). In addition, the FIRE LED on the No. 685's front panel will be illuminated for fire alarms.

Example:

Printout: (TIME & DATE) 13 0123 0555 5555 7 (V) FIRE TROUBLE ZONE 1
 Display: 13 0123 0555 5555 7 (TIME & DATE)

Opening/Closing Reports: Openings and Closings by user/zone will be handled, as well as the usual method of sending alarm codes B and C for openings and closings, respectively.

For openings and closings by user/zone, the messages will be translated to the Ademco High Speed format for display/printing purposes. In this format, the digit in channel position 1 indicates the user/zone number. Channel positions 2 through 9 are then filled with the digit 2 for openings and 4 for closings.

For example, an opening by user number 3 at account 123 would be printed as follows:

Printout: (TIME & DATE) 13 0123 3222 2222 2 (V) OPENING USER #3
 Display: 13 0123 3222 2222 2 (TIME & DATE)

Status Reports: Status reports may be sent by some Radionics control/communicators. The report consists of all messages that have been sent since the last opening or closing.

When a status report is received, the following events occur:

1. All messages received as part of the status report are flagged by printing the word *STATUS* in place of the (M) (V) indicators.
2. The messages contained in the report are held back from the Ademco computer since they do not require operator action.

3. At the end of the status messages, a special message consisting of the account # followed by an alarm code of 'S' will be printed and sent to the computer. This message may be used to supervise accounts with periodic test reports.

For example, if a status report is triggered after a closing has occurred, the printer will show:

```
(TIME & DATE) 13 0123 3444 4444 4 *STATUS* CLOSING-USER #3
(TIME & DATE) 13 0123 S (V) STAT. REPORT

Display:          13 0123 3444 4444 4 (TIME & DATE)
                  13 0123 S (TIME & DATE)
```

However, the computer will only receive the message 13 0123 S

Force Arming Reports: When an alarm system transmitting in BFSK format reports that it has been force-armed, the No. 685 Receiver will generate a special force-arming message. This message consists of the account number followed by an alarm code of 'W'.

For example, if user 3 force-arms account #123, the printer will show:

```
(TIME & DATE) 13 0123 3444 4444 4 (V) CLOSING-USER #3
(TIME & DATE) 13 0123 W (V) FORCE ARMING

Display:          13 0123 3444 4444 4 (TIME & DATE)
                  13 0123 W (TIME & DATE)
```

AC Power Failure Reports: If a BFSK communicator reports the failure of AC power, the No. 685 will generate a high speed message to indicate the failure. The message for account #123 would be as follows:

```
Printout: (TIME & DATE) 13 0123 1555 5555 6 (V) AC POWER FAILURE
Display:   13 0123 1555 5555 6 (TIME & DATE)
```

Note: Due to the nature of the BFSK power failure reporting method, an AC failure message will be printed and sent to the computer each time a call is received from a system that has lost AC power. AC restoral reports are not sent by BFSK communicators.

Telephone Line Failure/Restoral Reports: In the event that a BFSK communicator reports a failure of one of its phone lines, the No. 685 will generate a high speed message to indicate the failure. The message will show a 1 in the 6th channel position along with a 6 in the 9th channel position.

For example, a phone line failure at account 123 would produce the message:

```
Printout: (TIME & DATE) 13 0123 5555 5155 6 (V) TELCO LINE ALARM
Display:   13 0123 5555 5155 6 (TIME & DATE)
```

In a similar manner, a restoral of the telephone line will produce a restoral message to be displayed/printed, for example:

```
Printout: (TIME & DATE) 13 0123 5555 5355 6 (V) TELCO LINE RESTORE
Display:   13 0123 5555 5355 6 (TIME & DATE)
```

POPEX Trouble/Restore Reports: In the event that a BFSK communicator reports a POPEX failure, the No. 685 will generate the following high speed message:

Printout: (TIME & DATE) 13 0123 5505 5555 6 (V) SYSTEM FAILURE
Display: 13 0123 5505 5555 6 (TIME & DATE)

Note that code 0 is used to indicate a new trouble in this case and appears in the channel 3 position, thus indicating a system failure, which appears in the printout above.

A restoral will produce the following message:

Printout: (TIME & DATE) 13 0123 5535 5555 6 (V) SYSTEM FAILURE RESTORE
Display: 13 0123 5535 5555 6 (TIME & DATE)

Telco Communication Channel Trouble Reports: A trouble report in telephone communication during a test report call will generate the following high speed message:

Printout: (TIME & DATE) 13 0123 5555 0555 6 (V) COMM. CHAN. TROUBLE
Display: 13 0123 5555 0555 6 (V) (TIME & DATE)

Note that code 0 (New Trouble) and **not** code 1 (New Event) is used in the channel 5 position, because the trouble is not related to Long Range Radio (a trouble in that area would use code 1 in the channel 5 position). This is clarified in Table B (see explanatory notes at foot of table in connection with the use of codes 1 and 0).

Restoral reports are not sent in this case.

Unsuccessful/Successful Download or Power-on Reset Trouble Reports: An unsuccessful download or a power-on reset trouble will generate the following high speed message:

Printout: (TIME & DATE) 13 0123 5550 5555 6 (V) PWR-ON RESET TROUBLE
Display: 13 0123 5550 5555 6 (TIME & DATE)

Note that the English language message in the printout will be the same for either report (unsuccessful download or power-on reset trouble), and that code 0 (New Trouble) **not** code 1 is used in the channel 4 position (a code 1 in channel 4 position would be related to a Long Range Radio problem).

A successful download or power-on reset restoral will produce the following message:

Printout: (TIME & DATE) 13 0123 5553 5555 6 (V) PWR-ON RESET RESTORE
Display: 13 0123 5553 5555 6 (TIME & DATE)

E. System Messages: (also see Section XI, COMPUTER INTERFACE)

1. RCVA Group Messages (Peripheral Device Fail/Restore):

An RCVA Group message (format similar to HIGH SPEED) will appear if a trouble develops in any of the peripheral devices (computer, printer, AC power, battery). A failure will be indicated by a '1' in the corresponding position, while a restoral will be indicated by a '3' in the corresponding channel position. The ACCOUNT NUMBER will be RCVA.

An English language message will be printed for RCVA Group messages even if the English language option has not been chosen for subscriber alarm messages. See Table D for RCVA Group message codes and their meaning.

TABLE D: RCVA GROUP MESSAGES		
CHANNEL POSITION	RCVA CODE	MEANING (AND PRINTOUT)
1	1	COMPUTER FAILURE
	3	COMPUTER RESTORE
* 2	1	SERIAL PRINTER FAILURE
	3	SERIAL PRINTER RESTORE
* 3	1	EXTENSION PRINTER (MODEM) FAILURE
	3	EXTENSION PRINTER (MODEM) RESTORE
* 4	1	PARALLEL PRINTER FAILURE
	3	PARALLEL PRINTER RESTORE
5	1	AC POWER FAILURE
	3	AC POWER RESTORE
**6	1	SYSTEM BATTERY FAILURE
	3	SYSTEM BATTERY RESTORE
1-8	5	NORMAL
1-6	6	PREVIOUSLY REPORTED FAILURE
"9"	7	NORMAL
ACCOUNT NUMBER is always: RCVA LINE (GRP.) No. is always: 0 RECEIVER NUMBER will be as selected: 1 to 9 All printouts include valid (V) indication. Multiple message printouts include (M) (V) indication.		

* PRINTER FAILURE may indicate any of the following conditions:

- a. Out of paper
- b. Printer taken "Off-line" for paper changing or ribbon replacement
- c. Printer cable unplugged
- d. Printer failure
- e. Loss of A.C. power to the printer

** SYSTEM BATTERY FAILURE indicates that the backup battery voltage has dropped below 11.2 volts. This will normally occur only during an A.C. power failure.

Example:

6:30 PM 03/05 10 RCVA 5155 1555 7 (M) (V) SER. PRINTER FAILURE

The Serial Printer has failed and the A.C. Power Line has also failed. Note the (M) to indicate that multiple messages are present. When multiple messages occur, the English Language output is associated only with the most significant channel. By definition, Channel 1 is more significant than Channel 2, etc.

2. **RCVB Group Messages (Operator-Triggered Condition or Message Transmission Error):**

An RCVB Group message (format similar to HIGH SPEED) will indicate conditions either triggered by the operator or caused by a message transmission error. An event will be indicated by a '1' in the corresponding channel position. The ACCOUNT NUMBER will be RCVB.

See Table E.

Examples (assumed receiver number is "1"):

- a) **SYSTEM RESET:** When the system is first turned on or whenever the SYSTEM RESET switch is operated, the following message will be printed, after a 3 second delay.

12:00 AM 01/01 10 RCVB 1555 5555 7 (V) SYSTEM RESET

- b) **MANUAL PRINT MODE ON:** This message is used to indicate that the AUTO/MANUAL DISPLAY/PRINT switch has been moved to the MANUAL position.

12:00 AM 01/01 10 RCVB 5155 5555 7 (V) MANUAL PRINT MODE ON

TABLE E: RCVB GROUP MESSAGES		
CHANNEL POSITION	RCVB CODE	MEANING (AND PRINTOUT)
1	1	SYSTEM RESET
2	1	MANUAL PRINT MODE ON
3	1	BATT TEST FAIL
4	1	AUTO PRNT MODE ON
5	1	BATT TEST PASS
6	1	TRANSMISSION ERROR
7	1	TIME/DATE RESET
1-8	5	NORMAL
TEST(9)	7	NORMAL
TEST(9)	9	SYSTEM TEST
ACCOUNT NUMBER is always: RCVB		
LINE (GRP.) No. is always: 0		
RECEIVER NUMBER will be as selected: 1 to 9		
All printouts include valid (V) indication		

- c) **BATTERY TEST FAILURE:** If the battery condition triggers the low battery detector during a battery test, the test will be terminated and this message will be sent to the display, printer and computer* (if present).

12:00 AM 01/01 10 RCVB 5515 5555 7 (V) BATT TEST FAIL

*Not relevant to UL864 listed fire alarm monitoring.

- d) **AUTO PRINT MODE ON:** This message is used to indicate that the AUTO/MANUAL DISPLAY/PRINT switch has been restored to the AUTO position.

12:00 AM 01/01 10 RCVB 5551 5555 7 (V) AUTO PRINT MODE ON

- e) **BATTERY TEST PASS:** This message indicates that the battery voltage has remained above the low battery threshold and the test has been completed (see Section III A 4).

12:00 AM 01/01 10 RCVB 5555 1555 7 (V) BATT TEST PASS

- f) **TRANSMISSION ERROR:** This message is used to flag the occurrence of an abnormal message transmission. It will be printed after each such occurrence as well as being sent to the computer (if used). The operator should then check the printer messages.

Conditions which will trigger a TRANSMISSION ERROR message are as follows:

- 1) **NO TRANSMISSION:** If the "handshake" tone is sent to the protected premises and no tones are received, a NO XMISSION alarm message will be printed, followed by the RCVB Group TRANSMISSION ERROR message.
- 2) **BAD TRANSMISSION:** If a "kissoff" tone has not been sent to the premises during a call (message not valid), the last alarm message received will be printed with the message BAD XMISSION, followed by an RCVB Group TRANSMISSION ERROR message. By doing so, the No. 685 alerts the operator to a possible phone line or communicator problem.

A BAD XMISSION message will also be generated if the alarm message has been broken up during transmission. In this case, some of the alarm message digits will be an "X" and additional information will follow the BAD XMISSION portion of the message as follows:

BAD XMISSION-BURST ERROR: Portion of a digit (or digits) lost in transmission.

BAD XMISSION-LONG BURST: Improper pulse spacing (e.g., Due to phone line echo).

BAD XMISSION-DIGIT COUNT: Insufficient number of message digits received.

Example:

12:00 AM 01/01 12 3457 5XXX XXXX X BAD XMISSION-DIGIT COUNT

12:00 AM 01/01 10 RCVB 5555 5155 7 (V) TRANSMISSION ERROR

The TRANSMISSION ERROR message is useful in conjunction with a computer. Since the computer is only sent valid messages, in certain cases, a bad transmission may not contain the proper number of characters and may never get sent to the computer. The TRANSMISSION ERROR message is formatted to reach the computer to advise the operator to check the receiver/printer.

- g) **TIME/DATE RESET:** Whenever the time and/or date is set, a message is sent to the printer and the computer.

Example:

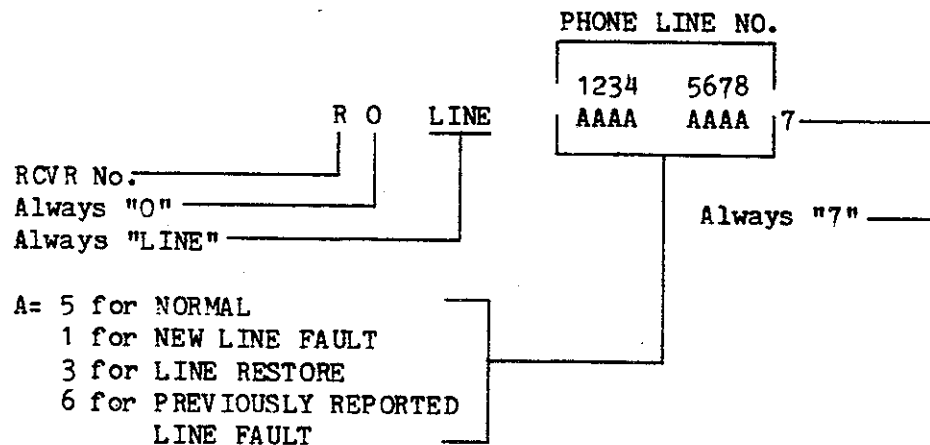
12:00 AM 01/01 10 RCVB 5555 5515 7 (V) TIME/DATE RESET

- h) **SYSTEM TEST:** This message is generated whenever the SYSTEM TEST Button is pressed as described in Section III A 5.

12:00 AM 01/01 10 RCVB 5555 5555 9 (V) SYSTEM TEST

3. LINE Group Messages (Telephone Line Fault/Restore):

Whenever a telephone line fault or restore occurs, the following message format will appear on the display and (if present) printer and computer.



Examples: 20 LINE 5155 5555 7
(receiver No. 2, line 2 has a fault)

20 LINE 5355 6555 7
(receiver No. 2, line 2 has restored,
previously reported line fault on line 5)

V. MEMORY CARD SETUP PROCEDURE

In order to interface properly with any peripheral devices connected to the receiver (printers, computer), the plastic jumper plugs on the memory card must be properly positioned.

As shipped, the memory card is set up for operation with a parallel printer. If any other peripherals are used, the jumper plugs must be repositioned. See the following procedure and Diagram 4.

The memory card is located in the third card slot (J3) from the receiver's front panel. See Diagram 3 (**Note:** The second card slot is empty).

If Repositioning of the Jumper Plugs is Required:

1. Turn off all power to the No. 685 (battery as well as AC).
2. Remove the top cover from the No. 685 by removing 4 screws. Make sure all packing material is removed.
3. Locate the memory card and remove it by pulling up on the inside handles of the card ejectors (white plastic parts, located at the upper corners of the board).
4. Reposition the plastic jumper plugs as required, in accordance with Diagram 4.
5. Before replacing the memory card in slot J3, program its option PROM chip (No. 691) as required, in accordance with Section VI.

VI. OPTION PROM CHIP FOR MESSAGE LIGHTS, ENGLISH LANGUAGE PRINTER OUTPUTS AND OPERATING OPTIONS

The No. 685 contains 27 English language messages from which outputs can be selected for the printer (if used), and assigned to each of the **alarm codes** receivable in LOW SPEED (Ademco Standard, Radionics, or SESCOA format) and **channel positions** receivable in HIGH SPEED format. In addition, the eight MESSAGE TYPE display lights on the face of the No. 685 are associated with certain of the English language messages.

The messages are assigned, and other operating options can be chosen (see subheading B in this section), by programming the option PROM chip (No. 691) provided on the memory card (see subheading C in this section).

A. English Language Messages for Printout and Display Lights:

1. English Language Using Table Lookup:

Table F lists the 27 English language messages for printout that can be assigned to specific **alarm codes** (LOW SPEED, Ademco Standard, Radionics, or SESCOA format) and **channel positions** (Ademco HIGH SPEED format) during programming of the option PROM chip (No. 691) for the memory card.

In addition, message numbers 81-89 may be used to print ZONE alarms for channels 1-9.

Also listed in Table F are the MESSAGE TYPE display lights on the face of the No. 685 that are associated with certain of the English language messages.

This message/display feature can be used only in conjunction with standardized digital communicator codes. For instance, alarm code 1 must mean the same thing (such as burglary) for all LOW SPEED (Ademco Standard, Radionics, or SESCOA format) communicators transmitting to the No. 685. One set of standard codes can be assigned to LOW SPEED (Ademco Standard, Radionics, or SESCOA format) and a separate (different or identical) set can be assigned to HIGH SPEED.

If there are non-standard communicator codes transmitting on separate phone lines, the message/display feature can be omitted for any or all lines by not programming the option PROM chip's ENGLISH LANGUAGE ENABLE OPTION for the associated line card(s).

This message/display feature can be used with any combination of the various line cards present in the No. 685, as long as a set of standardized communicator codes are used for all LOW SPEED (Ademco Standard, Radionics or SESCOA format) line cards and a set is used for all HIGH SPEED line cards.

For 4-2 reports, the first digit of the alarm code is used in determining the English Language printout. A zone number is then added to the end of the message. For example, if the message 0123 14 were received, the No. 685 would select the message associated with code 1 and print it.

0123 14 FIRE ALARM ZONE 4

TABLE F: ENGLISH LANGUAGE MESSAGES				
MESSAGE #	ALARM MESSAGE	HIGH SPEED (ONLY) RESTORE MESSAGE (See Note "d")	MESSAGE TYPE DISPLAY LIGHT ON NO. 685	SEE NOTES
01	blank	-	-	a,f
02	OPENING DO	-	OPENING	b,f
03	CLOSING NOT	-	CLOSING	b,f
04	RESTORE USE	-	RESTORE	c,f
05	CANCEL WITH	-	-	e,f
06	TEST HIGH SPEED FORMAT	-	TEST	f,g
07	AUXILIARY ALARM	AUXILIARY RESTORE	-	f
08	LOW BATT/AC ALARM	LOW BATT/AC RESTORE	LOW BATT.	f,g,h
09	SHUNTED ZONE	SHUNTED ZONE RESTORE	-	f
10	HOLD-UP ALARM	HOLD-UP RESTORE	HOLD-UP	
11	FIRE ALARM	FIRE RESTORE	FIRE ALARM	
12	BURGLAR ALARM	BURGLAR RESTORE	BURG. ALARM	
13	SPRINKLER ALARM	SPRINKLER RESTORE	FIRE ALARM	
14	INTERNAL ALARM	INTERNAL RESTORE	BURG. ALARM	
15	LOW BATT. ALARM	LOW BATT. RESTORE	LOW BATT.	g,h
16	AC POWER ALARM	AC POWER RESTORE	-	
17	FREEZER ALARM	FREEZER RESTORE	-	
18	BOILER ALARM	BOILER RESTORE	-	
19	MEDICAL ALARM	MEDICAL RESTORE	-	
20	BURG. ZONE 1 ALARM	BURG. ZONE 1 RESTORE	BURG. ALARM	
21	BURG. ZONE 2 ALARM	BURG. ZONE 2 RESTORE	BURG. ALARM	
22	BURG. ZONE 3 ALARM	BURG. ZONE 3 RESTORE	BURG. ALARM	
23	MEDICAL ALARM	MEDICAL RESTORE	HOLD-UP	j
24	HOLD-UP ALARM	HOLD-UP RESTORE	BURG. ALARM	j
25	PANIC ALARM	PANIC RESTORE	HOLD-UP	
26	FIRE TROUBLE	FIRE TROUBLE RESTORE	-	
27	HOSTAGE	HOSTAGE RESTORE	HOLD-UP	
81-89	ZONE N (N=1-9) ALARM	ZONE N (N=1-9) RESTORE		1

NOTES TO TABLE F:

- a. For HIGH SPEED format, program a blank (01) for the opening/closing channel in the No. 685. If that channel in the No. 678 Digital Communicator is programmed for opening/closing or if the proper expanded format messages are received from a control/communicator, the No. 685 will automatically light the proper display (OPENING or CLOSING) and generate the English language (OPENING or CLOSING) message for the printer, if used.
- b. For LOW SPEED format, separate alarm codes must be used for opening and closing and the proper OPENING (02) or CLOSING (03) message designated. For example, if code 8 represents an opening, an OPENING (02)

message, must be programmed to correspond to code 8. If code 5 is a closing, a CLOSING (03) message must be selected to correspond to code 5.

- c. For LOW SPEED format, a RESTORE (04) message should be programmed for those alarm codes that indicate restoring of specific alarms. For example, if code 2 is FIRE ALARM and code 7 restores code 2 and if code 3 is BURGLAR ALARM and code 8 restores code 3, then both code 7 and code 8 must be assigned a RESTORE (04) message. The word RESTORE will print if either code 7 or code 8 is received, without identifying in English which condition restored.
 - d. For HIGH SPEED format, the word RESTORE is automatically added to the corresponding alarm message when a restore message is received. For example, if channel 2 is designated as a FIRE ALARM (11) message channel, a restore status code received on channel 2 results in the message FIRE RESTORE.
 - e. A CANCEL (05) message is equivalent to abort.
 - f. For LOW SPEED format, alarm code 9 must be programmed for English language if an output is desired. Messages 01 through 09 may be used, but the initial "0" digits are not used during programming (for other alarm codes, the "0" digits are retained during programming).
 - g. For HIGH SPEED format, English language and display light for channel 9 (LOW BATTERY and TEST) are automatic. No programming of channel 9 is required. For expanded reports (OPEN, CLOSE, BYPASS, TROUBLE and SYSTEM) channels 1-8 should be programmed. Unless "Zone ENGLISH" is used, no further programming is required.
 - h. When a SESCOA format line card (No. 685-3) is used, a received code "0" automatically produces LOW BATTERY at the printer and lights the LOW BATT. display light on the No. 685. No English language programming is necessary in this case.
 - j. Message numbers 23 and 24 are for special applications and enable a display light to be used for MEDICAL ALARM*. As there is no such designated display light on the No. 685, if message 23 is programmed a "MEDICAL ALARM" label should be made to cover the "HOLD-UP" display light designation. If a HOLD-UP output is required as well, use message 24 and make a "HOLD-UP" label to cover the BURG. ALARM designation above that display light. In this case, do not also program any burglary-related message (12, 14, 20, 21 or 22).
- *Not relevant to UL 864 listed fire alarm monitoring.
- k. If a message number beyond "27" is inadvertently programmed, "LOOKUP ERROR NN" will be printed, where NN is the message number.
 - l. Message numbers 81-89 may be used to print ZONE N ALARM and ZONE N RESTORE (N = 1-9) for non-standardized channels. Program 81 for Zone 1, 82 for Zone 2, etc.

Example: HIGH SPEED Message/Display Indications.

The full capability of the message/display feature is exploited with the HIGH SPEED format. This is best illustrated with an example (refer to Tables B and F):

PROGRAMMED ENGLISH LANGUAGE MESSAGE

CHANNEL	MESSAGE	MESSAGE #
1	HOLD-UP ALARM	10
2	FIRE ALARM	11
3	BURGLAR ALARM	12
4	INTERNAL ALARM	14
*5	blank	01
6	SPRINKLER ALARM	13
7	BOILER ALARM	18
8	AUXILIARY ALARM	07

*OPENING/CLOSING channel (the English OPENING and CLOSING messages are built into the No. 685 for HIGH SPEED format).

Various conditions occurring on the channels (not necessarily in the order shown) will result in displays and printouts as follows:

CHANNEL No.	CHANNEL CONDITION/ STATUS CODE	DISPLAY LIGHT ON	PRINTED MESSAGE
1	New Alarm/1	HOLD-UP	HOLD-UP
1	Previous Event/6	none	none
1	Normal/5	none	none
1	New Restore/3	RESTORE	HOLD-UP RESTORE
2	New Alarm/1	FIRE ALARM	FIRE ALARM
2	New Restore/3	RESTORE	FIRE RESTORE
3	New Alarm /1	BURG. ALARM	BURGLAR ALARM
3	New Restore/3	RESTORE	BURGLAR RESTORE
4	New Alarm/1	BURG. ALARM	INTERNAL ALARM
4	New Restore/3	RESTORE	INTERNAL RESTORE
5	New Opening/2	OPENING	OPENING
5	New Closing/4	CLOSING	CLOSING
6	New Alarm/1	FIRE ALARM	SPRINKLER ALARM
6	New Restore/3	RESTORE	SPRINKLER RESTORE
7	New Alarm/1	None	BOILER ALARM
7	New Restore/3	RESTORE	BOILER RESTORE
8	New Alarm/1	none	AUXILIARY ALARM
8	New Restore/3	RESTORE	AUXILIARY RESTORE

2. **"Zone English":** The "Zone English" option is available to allow English language outputs to the printer in response to messages received by the No. 685-2, even if channel codes have not been standardized. The English Language output must be enabled for the particular card(s) involved, as described in Section VI B.

New alarm (channel status code 1, per Table B) and restore (status code 3) conditions will be identified by zone (ZONE 1 ALARM or ZONE 1 RESTORE for channel 1, etc.) **without** specifying the **type** of alarm or restore (fire, burglar, etc.)

OPENING (status code 2), CLOSING (4), LOW BATTERY (8) and TEST (9) conditions will cause the appropriate message to be printed as well as turn on the corresponding MESSAGE TYPE display LED on the No. 685.

For example, if a message indicating a new alarm on channel 2 is received (Receiver No. 1, Group No. 3, Account No. 890), the following message would be printed:

12:30 AM 01/01 13 0890 5155 5555 7 (V) ZONE 2 ALARM

If multiple reporting conditions occur, only the English language for the most significant condition (lowest channel #) will be printed; however, an (M) will be printed ahead of the English language message.

B. Operating Options:

The following options can be selected during the programming of the option PROM chip (No. 691) on the memory card, as described in Section VI C.

1. **English Language Enable:** As shipped, the English language output is disabled on all 8 line cards. **THIS OPTION MUST BE USED TO ENABLE ANY OR ALL LINE CARDS TO PRODUCE ENGLISH LANGUAGE PRINTOUTS.** However, any line which receives non-standardized alarm codes should **not** be enabled, unless the "Zone English" option (see next paragraph) is used.
2. **"Zone English" Enable:** This option is used to enable "Zone English" (described in the previous section, VI A 2) on any or all No. 685 Line Cards.

Important: When this option is selected, the English Language Enable (see option 1 above) must **also** be selected for the **same** line card(s).

3. **Remote Alert Delay:** Unless the Pulse Relay option is selected (see option 8 below), the operation of the No. 685's remote alert contacts follows the No. 685's internal alert, after a user selectable delay of up to 50 seconds.

Note: Maximum distance between the 685 Receiver and the remote alert sounder is 50 feet.

4. **50 Hz*:** When this option is selected, the No. 685's clock and calendar will synchronize with a 50 Hz. AC power source, instead of the standard 60 Hz (utilized outside of the U.S.A.).

5. **Eur. Cal.:** This option causes the date to be displayed and printed to conform to the European style of day/month rather than the U.S. style of month/day. For example, June 1 will appear as 01/06 instead of 06/01.
6. **Auto AC:** Normally, if AC power fails, the No. 685 switches to the MANUAL mode. This is done to prevent loss of signals, before an operator can read them, when an AC powered printer such as the Ademco No. 786 is used. If a 12V.DC printer (with its own standby) is used, the switching of mode is not required. If the **Auto AC** option is selected, the No. 685 will remain in the AUTO mode if AC fails.
7. **Test Msg*:** This option produces a test message which is transmitted to the computer (if used) every 10 minutes. If an operator fails to see activity at the computer periodically he/she knows that the No. 685 or the connection to the No. 685 has failed (assuming the computer is still connected). The transmitted message is in LOW SPEED format, with RCVR No. "C", GRP No. (blank), ACCOUNT No. "TEST" and alarm code "9".
8. **Pulse Relay:** This option causes the dry contacts of the remote alert relay to close for 2 seconds whenever the internal alert tone is triggered (even if the alert tone has been silenced or if the volume on the alert tone has been turned all the way down). The contact closure may be used to produce a 2-second output at a remote sounder (do not use bells or mechanical horns) or it may be used to trigger a remote latching circuit for applications requiring the remote alert to be silenced manually.

If this option is selected, the Remote Alert Delay feature (see option 3) is disabled.

9. **300 Baud, 1200 Baud:** This option is used to change the transmission baud rate of the No. 685's serial RS232 data outputs (serial printer, extension printer, computer). The normal Baud rate is 600 (required for Ademco CAPS computer)*. If either 300 or 1200 Baud is selected, the PROM can be reprogrammed back to 600 Baud later.

*10. **Computer Options:** See Section XI B.

C. **Programming the Option PROM Chip:**

Programming the option PROM chip requires the use of the No. 690 PROM Programmer. If the user does not have access to a No. 690, the PROM can alternatively be programmed by Ademco (contact the nearest Ademco facility or the Ademco sales representative).

*Not relevant to UL 864 listed fire alarm monitoring.

1. Fill in PROM CHART 1 (See Table of Contents for location) **ENGLISH LANGUAGE MESSAGE SELECTION** by assigning messages (from Table F) to the HIGH SPEED channels and LOW SPEED alarm codes, as required. Do not program alarm code "0". Also note that messages #2 to 6 are not used with the HIGH SPEED format. For unused channels (or codes) program a blank.

EXAMPLE

PROM CHART 1: ENGLISH LANGUAGE MESSAGE SELECTION				
CHANNEL # (HIGH SPEED) OR ALARM CODE (LOW SPEED)	HIGH SPEED		LOW SPEED	
	*MESSAGE#	AND MESSAGE	*MESSAGE#	AND MESSAGE
	(From Table F In Instructions)		(From Table F In Instructions)	
1	12	BURGLAR ALARM	10	HOLD-UP ALARM
2	14	INTERNAL ALARM	11	FIRE ALARM
3	09	SHUNTED ZONE	19	MEDICAL ALARM
4	01	BLANK	16	AC POWER ALARM
5	13	SPRINKLER ALARM	20	BURG. ZONE 1 ALARM
6	17	FREEZER ALARM	07	AUXILIARY ALARM
7	01	BLANK	04	RESTORE
8	07	AUXILIARY ALARM	15	LOW BATTERY ALARM
9	NOT USED		05	CANCEL

*Include all leading zeroes in MESSAGE #. If no message desired, select "01".

**Restricted to single digit MESSAGE # (1 to 9). Omit leading zeroes. If no message desired, enter "1".

ENTER MESSAGE #'s AND MESSAGES FROM TABLE F IN INSTRUCTIONS. HIGH SPEED AND LOW SPEED SELECTIONS CAN BE DIFFERENT OR SIMILAR.

2. Fill in PROM CHART 2 (See Table of Contents for location) **ENGLISH LANGUAGE MESSAGE PROGRAMMING** by transferring the message #s to it from CHART 1. Enter the message # for each channel or alarm code, vertically, with the first digit (including initial zeroes) on top, as shown in the following example:

EXAMPLE

PROM CHART 2: ENGLISH LANGUAGE MESSAGE PROGRAMMING																
PHONE NUMBER SWITCH SETTING	ROTARY SWITCH SETTING															
	ACCESS#								MAIN#							
PRIMARY (1st Digits)	1	1	0	0	1	1	0	0	1	1	1	1	2	0	0	1
SECONDARY (2nd Digits)	2	4	9	1	3	7	1	7	0	1	9	6	0	7	4	5
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
	HIGH SPEED CHANNELS								LOW SPEED ALARM CODES							

- *Insert all leading zeroes. If no message desired, program "01".
 **Restricted to single digit (1 to 9). If no message desired, program "1".

- Fill in PROM CHART 3***: LINE CARD ENGLISH LANGUAGE ENABLE by placing a check in each box corresponding to the line card number (not group or slot number) for which an English language output is desired. Note: Line card number corresponds to telephone line number.
- Fill in PROM CHART 4***: LINE CARD "ZONE ENGLISH" OPTION ENABLING only if there are Line Cards for which the "Zone English" option is desired. Place a check in each box corresponding to the line card number (not group or slot number) for which "Zone English" printouts are desired.

Important: Make sure Step 3 has been followed regardless of which type of line cards will be used or no English language output will be enabled.

- Fill in PROM CHART 5***: REMOTE ALERT DELAY SELECTION (unless the Pulse Relay Option is to be selected in which case, skip this step). Note: if no programming is done, the delay will be one second. Check the box(es) corresponding to the switch number(s) indicated in the chart's table for the delay (up to 50 seconds) desired. For example, if a 15-second delay is desired, check boxes 1 and 2.
- Fill in PROM CHART 6***: OPERATING OPTION SELECTION by placing a check in each box for which the option is desired. The normal Baud rate of the data outputs is 600. If either 300 or 1200 Baud is selected, the PROM can be reprogrammed later back to 600 Baud by then programming the 1200 or 300 Baud option respectively (the one not selected previously).

***See Table of Contents for location.

7. Fill in PROM CHART 7*: COMPUTER OPTION SELECTION (unless a computer will not be used, in which case, skip this step). See Section XI B for an explanation of the computer options. Place a check in each box for which the option is desired.
8. Fill in PROM CHART 8*: CODE 9 RESTORE REPORT TRANSLATION by placing a check in each box corresponding to the line card number (not group or slot number) for which translation of Code 9 Restoral reports into Ademco HIGH SPEED is to be enabled.
9. Fill in PROM CHART 9*: LINE CARD 3-1 WITH CHECKSUM ENABLING by placing a check in each box corresponding to the line card number (not group or slot number) for which 3-1 Checksum reports are to be enabled.
10. If not already done, turn off all power to the No. 685 and disconnect the standby battery.
11. Raise the memory card (slot J3) part way, using its plastic card ejector tabs and remove the (No. 691) option PROM (use a No. 692-1 PROM Removal Tool) from the board's upper center section (see Diagram 4). The PROM has a red or blue label.

* See Table of Contents for location

12. Insert the PROM into the NEW PROM Socket of the No. 690 PROM Programmer and set the PROM TYPE switch to its RED position for a red label PROM or to its BLUE position for a blue label PROM.

ENGLISH LANGUAGE MESSAGE PROGRAMMING (PROM CHART 2)

Note: Skip Steps 13 through 17 if no English Language messages are desired or if only "Zone English" messages are to be used.

13. Slide the No. 690's PHONE NUMBER switch to its PRIMARY position. Turn the rotary switch to ACCESS #. Hold the PROGRAM switch down while entering (via the keypad) the first 4 digits in the top row of PROM CHART 2 (1 1 0 0 in example). Release the PROGRAM switch.
14. Turn the rotary switch to MAIN # and similarly program the next 12 digits in the top row of PROM CHART 2 (1 1 0 0 1 1 1 1 2 0 0 1 in example).
15. Slide the PHONE NUMBER switch to SECONDARY. Turn the rotary switch back to ACCESS # and program the first 4 digits in the bottom row of PROM CHART 2 (2 4 9 1 in example).
16. Turn the rotary switch to MAIN # and program the next 12 digits in the bottom row of PROM CHART 2 (3 7 1 7 0 1 9 6 0 7 4 5 in example).
17. Slide the PHONE NUMBER switch back to PRIMARY. Turn the rotary switch to SUB's ID # and program the remaining digit in PROM CHART 2 (5 in example).

LINE CARD ENGLISH LANGUAGE ENABLING (PROM CHART 3)

18. Turn the rotary switch to its **RESTORE** position.
19. Refer to **PROM CHART 3** and push up the **OPTION/CHANNEL SELECTION** slide switches corresponding to each box checked.
20. Momentarily pull down the **PROGRAM** switch. An LED will light for each enabled position.
21. Return all **OPTION/CHANNEL SELECTION** switches to the normal (down) position.

LINE CARD "ZONE ENGLISH" OPTION SELECTION (PROM CHART 4)

22. Turn the rotary switch to its **16 SEC. DELAY** position.
23. Refer to **PROM CHART 4** and push up the **OPTION/CHANNEL SELECTION** slide switches corresponding to each box checked.
24. Momentarily pull down the **PROGRAM** switch. An LED will light for each enabled position.
25. Return all **OPTION/CHANNEL SELECTION** switches to the normal (down) position.

REMOTE ALERT DELAY PROGRAMMING (PROM CHART 5)

Note: Skip Steps 26-29 if the Pulse Relay Option is to be selected or a 1-second remote alert delay is acceptable.

26. Turn the rotary switch to its **SECONDARY # ONLY** position.
27. Refer to **PROM CHART 5** and push up the **OPTION/CHANNEL SELECTION** switches corresponding to each box checked.
28. Momentarily pull down the **PROGRAM** switch. An LED will light for each programmed position.
29. Return all **OPTION/CHANNEL SELECTION** switches to the normal (down) position.

OPERATING OPTION PROGRAMMING (PROM CHART 6)

30. Turn the rotary switch to its **OPEN/CLOSE** position.
31. Refer to **PROM CHART 6** and push up the **OPTION/CHANNEL SELECTION** switches corresponding to each box checked.
32. Momentarily pull down the **PROGRAM** switch. An LED will light for each programmed position.
33. Return all **OPTION/CHANNEL SELECTION** switches to the normal (down) position.

COMPUTER OPTION PROGRAMMING (PROM CHART 7)

(Not relevant to UL 864 fire alarm monitoring)

Note: Skip Steps 34 to 41 if a computer will not be used.

34. Turn the rotary switch to its **INVERTED** position.
35. Refer to **PROM CHART 7** and push up the **OPTION/CHANNEL SELECTION** switches corresponding to each box checked.
36. Momentarily pull down the **PROGRAM** switch. An LED will light for each programmed position.
37. Return all **OPTION/CHANNEL SELECTION** switches to the normal (down) position.

LINE CARD ENABLING OF CODE 9 RESTORE MESSAGE TRANSLATION (PROM CHART 8)

(see Section IV A for details.)

38. Turn the rotary switch to the **SYS.OPTION** position (position 5).
39. Refer to **PROM CHART 8** and push up the **OPTION/CHANNEL SELECTION** switches corresponding to each box checked.
40. Momentarily pull down the **PROGRAM** switch. An LED will light for each programmed position.
41. Return all **OPTION/CHANNEL SELECTION** switches to the normal (down) position.

LINE CARD ENABLING OF 3-1 WITH CHECKSUM MESSAGES (PROM CHART 9)

Since the No. 685 cannot distinguish a 4-1 message from a 3-1 with checksum message, a selection must be made for each line card.

42. Turn the rotary switch to position 12 (labelled **NOT USED**).
43. Refer to **PROM CHART 9** and push up the **OPTION/CHANNEL SELECTION** switches corresponding to each box checked.
44. Momentarily pull down the **PROGRAM** switch. An LED will light for each programmed position.
45. Return all **OPTION/CHANNEL SELECTION** switches to the normal (down) position.
46. Turn the rotary switch to **OFF** and remove the **PROM** from the **PROM Programmer**.
47. Reinsert the **PROM** into the **memory card** (use a No. 692 **PROM Insertion Tool**). The triangular mark on the **PROM** should be positioned in the lower left-hand corner (label "upside-down") as shown in **Diagram 4**. Push the **memory card** down into slot **J3**, using the plastic tabs, until it snaps into place.

VII. LINE CARD SETUP PROCEDURE

CAUTION: Do not remove or insert any of the No. 685's circuit cards without first turning off the No. 685's AC power, as well as disconnecting the standby battery.

A. Group Number Selection:

The group number is the second digit of the receiver's display (it follows the receiver number). It identifies the phone line on which a call was received. In the case where multiple phone lines are set up as a rotary group, the group number may be used to identify the rotary group number.

1. **Locate the group number selector switch on the line card** (see Diagram 5). Hold the line card with the components toward you and the gold fingers downward. The switch is a small square component with the numerals 0 to 9 printed on it and is located in the upper right-hand corner of the board.
2. **Rotate the center part of the switch** (use a small screwdriver) until the arrow thereon points to the desired line number (1-8). **DO NOT** attempt to use the number 0 or 9 for the line number.

B. HIGH SPEED Only Option (No. 685-2 HIGH/LOW SPEED Format Line Cards only):

If an Ademco High Speed communicating device is programmed to call the No. 685-2 HIGH/LOW SPEED Line Card, transmission should occur automatically at HIGH SPEED. No changes are required at the communicating device. The No. 685-2 sends a HIGH SPEED acknowledgment tone once (or twice, if necessary). If a HIGH SPEED response does not occur, the No. 685-2 will send a standard acknowledgment tone. Standard (LOW SPEED format) communicating devices can thus operate with the No. 685-2 as well. It also means that high speed communicating devices (unless specifically programmed otherwise) will transmit at LOW SPEED if, due to line noise, for example, it fails to respond to the two HIGH SPEED acknowledgments. In some communicators, if they have been programmed for a four-digit account number (i.e., anything but a zero in the first position), the account number will change at LOW SPEED (e.g., 1258 becomes 0258). To avoid possible errors, we recommend only having high speed communicators call in to a No. 685-2 card dedicated to HIGH SPEED only.

To convert the card to a HIGH SPEED only card, cut the WHITE loop jumper located in the upper right-hand corner of the line card. Make sure that the free ends of the wire cannot short to any adjacent areas.

C. Slow Communicator Option:

The No. 685 will wait up to 3.5 seconds between the end of the handshake tone and the start of the first message. Also, it will wait up to 5 seconds between messages before hanging up.

Some digital communicators manufactured by other companies (Franklin, DCI are among these) have long delays between the first and second transmitted messages. Additionally, some communicators also have a long time delay between the receipt of the handshake tone and the start of the messages.

In order to accommodate these units, a Slow Communicator option is available. When this option is chosen, the No. 685 will wait up to 7.5 seconds between the handshake tone and the start of messages. In addition, the allowable intermessage time is approximately 9 seconds.

Since the waiting periods are increased, in the Slow Communicator option, the system throughput will be reduced when it is chosen. If only Ademco communicating devices are used, this option is not recommended. However, if a doubt exists, it should be chosen.

To test a communicator to see if it may be used without choosing this option, test transmissions should be sent to the No. 685. A test should be made with an alarm code of "1" as well as another test with an alarm code of "9". The LED at the top of the line card will be lit as long as that line card is processing a call. When two or more line cards are connected to a rotary group, most calls will be processed on the first card. By observing the cards during a test transmission, one can determine which card is processing the call. To test a particular card in a rotary group, "busy" the other lines and send in a test transmission. To "busy" a line, connect a handset across it (or use a 560 ohm, 1 watt resistor if a handset is not available).

To choose the Slow Communicator option, cut the ORANGE loop jumper located at the line card's upper right area (see Diagram 5).

D. Handshake Modification Option (No. 685-1 LOW SPEED Format Line Cards Only):

Some digital communicators manufactured by other companies (e.g., NAPCO DD450) do not time the duration of the handshake signal. As a result, they may interpret the HIGH SPEED acknowledge or the "hold" signal produced by the No. 685 as a handshake signal. This will cause the communicator to send its message before the true handshake signal is sent.

Use of these communicators with the No. 685-2 or No. 685-8 (if programmed for Ademco High Speed) Line Card is not advised.

The No. 685-1 Line Card may be modified to eliminate the "hold" signal that is transmitted before the handshake tone. To do this, proceed as follows:

1. **Cut the YELLOW loop jumper located at the line card's upper center area (see Diagram 5).**
2. **Insert an unprogrammed No. 691 PROM in the empty socket located below the line card's option jumpers (see Diagram 5). Use a No. 692 PROM Insertion Tool. The triangular mark on the PROM should be positioned in the lower left-hand corner (label "upside-down").**

E. Bypassing Line Fault Testing:

In instances where the phone line is intact, but a line fault is indicated because of variation in the telephone company supplied loop current, the phone line testing feature can be bypassed by connecting a shorting wire between two pins on the line card, as shown in Diagram 5.

F. Inserting the Line Cards:

The slot for line card #8 is the rearmost slot (J13 in Diagram 3). Count down from the rear until you locate the slot for line card #1 (J6). The telephone connectors in the rear correspond to these line card # slots. Cut the tie wrap on the connector corresponding to the slot and connect the polarized plug to the connector on the top right side of the board.

Insert the line card in the slot and push firmly down using the plastic tabs until the board snaps into the socket and the tabs move upward.

CAUTION

THE ADEMCO LINE CARDS Nos. 685-5, 685-9 AND 685-9AT EACH REQUIRE TWICE AS MUCH ELECTRICAL CURRENT AS OTHER LINE CARDS IN THE 685 SERIES. CONSEQUENTLY, CERTAIN RESTRICTIONS MUST BE IMPOSED WHEN USING THESE CARDS IN THE No. 685 DIGITAL RECEIVER.

EACH LINE CARD USED WITH THE -5, -9 OR -9AT DESIGNATION REQUIRES THE CENTRAL STATION TO LEAVE ONE BLANK LINE CARD SLOT IN THE RECEIVER. IN EFFECT, EACH OF THESE HIGH CURRENT DRAWING CARDS USES UP 2 LINE CARD SLOTS IN THE RECEIVER.

VIII. INSTALLATION

As stated previously, the No. 685 is designed for installation in a standard 19" rack or for desk top installation*. The No. 685CX Cabinet is available for desk top installation.

The following applies to either type of installation.

A. Preliminary:

1. Locate a 24 hour, 120V, 60Hz, 15A source of AC power for use with the No. 685. Plug the line cord provided into the proper connector at the rear of the No. 685 but DO NOT CONNECT TO POWER YET.

Note: With non-UL Listed 220 volt export models, a 220VAC, 50 Hz outlet will be needed and the receiver's option PROM chip should be set for 50 Hz during programming (see Section VI B).

* Not relevant to UL Listed fire alarm monitoring.

2. **Position the (user-supplied) standby battery and connect the supplied connector cable assemblies to the battery in parallel as follows, but DO NOT CONNECT TO THE No. 685 YET.** Standby is necessary in order to prevent messages and the date and time from being lost during an AC power failure, even if it is only momentary. Do not attempt to use the No. 685 without battery backup. The No. 685 contains a built-in charger.

The No. 685 is intended to be used with a 12 volt 55 AH (minimum) maintenance-free standby battery such as a Globe GC 12550. This is a 55 AH battery that will provide up to 9 hours standby (U.L. requires 4 hours).

In non-UL listed applications, if the power outage can be expected to be very short (such as when a standby generator is available), a standard sealed lead-acid battery [such as an Ademco No. 630 (12V, 5 AH)] may be used to supply backup power.

Connect **both** connector cables provided in parallel to the battery but **DO NOT CONNECT THEM TO THE REAR OF THE No. 685 YET.**

- a. Splice the two RED wires together and connect them to the positive (+) side of the battery.
- b. Similarly connect the two BLACK wires to the negative (-) side of the battery.
3. **Remove the top cover from the No. 685 by removing 4 screws. Remove all packing material.**
4. **Observe the slot configurations shown in Diagram 3 in order to become familiar with the locations of: Memory Card, CPU Card, Display Driver Card, Line Cards. Note that slots J2 and J5 are, and should remain, empty.**
5. **Remove the memory card from Slot J3 and set its BLUE jumper plugs as described in Section V: MEMORY CARD SETUP PROCEDURE.**
6. **Remove the option PROM chip (No. 691) from the memory card, program it as required and re-insert it as described in Section VI: OPTION PROM CHIP FOR MESSAGE LIGHTS, ENGLISH LANGUAGE PRINTER OUTPUTS AND OPERATING OPTIONS. Use a No. 692-1 PROM Removal Tool when removing the PROM and a No. 692 PROM Insertion Tool when re-inserting the PROM.**
7. **Re-insert the memory card in slot J3. Push down on the plastic tabs until it snaps into place.**
8. **Make sure that the display driver and CPU boards are firmly seated in slots J1 and J4 respectively.**
9. **Set up and insert the line cards as described in Section VII: LINE CARD SETUP PROCEDURE. Start with slot J6 for line card #1 and proceed, in sequence, to slot J7 (line card #2), slot J8 (line card #3), etc. Do not forget to connect the appropriate polarized phone line plug to the connector at the top right side of each line card. Up to 8 line cards can be accommodated by the No. 685 (see CAUTION on previous page).**

10. Replace the receiver's cover.

B. Connections and Settings:

- 1. Connect a good earth ground** (a cold water pipe or electrical box grounding will serve this purpose in some locations) to the screw terminal marked **EARTH GROUND**. This screw is located on the lower right side of the No. 685's rear panel (see Diagram 2). This connection will provide a ground path for the system and **must** be used.
- 2. Connect printer(s) and/or computer*** to the appropriate connector(s) provided at the rear of the receiver.

Note: Use of shielded cable between the No. 685 and the printer(s) is recommended.

* Not relevant to UL 864 Listed fire alarm monitoring.

- 3. If optional connection to the REMOTE ALERT connector at the rear of the receiver is to be made** (see Section III D 5), use the two conductor cable assembly provided, at this time, and complete this portion of the connection procedure.
- 4. Set the switches in the DIP switch group and the RECEIVER NUMBER selector switch** (located inside the flip-down panel on the face of the receiver) in accordance with Sections III B and III C. Open the flip-down panel by pulling on the handle.
- 5. Connect the AC line cord** (previously plugged into the back of the receiver) to the **AC source****. The AC POWER light on the face of the receiver should illuminate, the TIME and DATE should appear on the display (though not yet correctly set) and the receiver's fan should operate.

** The AC source for the UL 864 Listed fire alarm monitoring is the wired-in receptacle in the 19-inch rack cabinet.

The software revision level should appear on the left display.

- 6. Plug both connectors from the standby battery cables** (previously connected to the battery) to the **BATTERY 12V** connectors at the rear of the receiver.
- 7. Set the date and time** via the appropriate switches behind the flip-down panel on the front of the receiver, as described in Section III C 5, 6, 7.
- 8. Connect the telephone line(s)** to the **TELCO LINES** terminals at the rear of the receiver, observing polarity. **Polarity must be observed, to allow the receiver's line fault monitors to operate.** Polarity may be determined by placing a DC voltmeter (50-volt scale) temporarily across the phone line. If the meter reads upscale, the positive (+) lead of the meter is connected to the positive (+) phone wire. If the meter reads downscale, the positive lead of the meter is connected to the negative (-) phone wire.

Connect the positive (+) phone wire to the "+/T" terminal and the negative (-) phone wire to the "-/R" terminal.

When all the phone lines have been connected, they may be tested at any time by momentarily pressing the SYSTEM TEST button on the No. 685's front panel. Within 10 seconds, all of the phone lines will be tested. If any of the lines shows a failure, check the polarity of the wiring. Also check to make sure that the phone line has been connected to the line card via the 3 pin connector located at the top of the line card.

An automatic test of the telephone lines will be made by the No. 685, if no calls are received for 10 minutes. The test occurs as follows:

- 1) The phone line is seized for 2 seconds.
- 2) A check is made for loop current in the line. If no current is found, a phone line failure will be flagged and a message will be generated.
- 3) The line is returned to the "On hook" condition.

TO THE INSTALLER

Regular maintenance and inspection (at least annually) by the installer and frequent testing by the user are vital to continuous satisfactory operation of any alarm system.

The installer should assume the responsibility of developing and offering a regular maintenance program to the user as well as acquainting the user with the proper operation and limitations of the alarm system and its component parts. Recommendations must be included for a specific program of frequent testing (at least weekly) to insure the system's proper operation at all times.

IX. TROUBLESHOOTING

Symptom	Probable Cause and/or Recommended Action
. AC POWER LIGHT OFF . SYSTEM OPERATING	A. AC power loss. Operating on battery. B. Fuse Blown (3A SLO-BLO, e.g., No. 90-10).
. AC POWER LIGHT OFF . SYSTEM NOT OPERATING	A. AC power loss. Battery Dead or Disconnected. B. Check fuses.
. AC POWER LIGHT ON . SYSTEM NOT OPERATING (NOT ANSWERING ALARMS)	A. Depress SYSTEM RESET switch. B. Remove power (AC and battery) and reset all cards.
. LINE FAULT DISPLAYED FOR LINES #1 THROUGH 8.	A. Check phone line connections. B. Check phone line voltage and polarity (see Section VIII B).

Symptom	Probable Cause and/or Recommended Action
<ul style="list-style-type: none"> RECEIVER NOT ACCEPTING TRANSMISSIONS FROM COMMUNICATORS. "TRANSMISSION ERROR" MESSAGE ON PRINTER. 	Monitor incoming transmissions with headset across TELCO LINE terminals in No. 685.
<ul style="list-style-type: none"> IF No. 685 HANGS UP LINE BEFORE TONES START: 	<ul style="list-style-type: none"> A. Cut Orange jumper on line card (see Diagram 5). B. Bad communicator.
<ul style="list-style-type: none"> IF NO TRANSMISSION RECEIVED AT ALL: 	<ul style="list-style-type: none"> A. Wrong communicator for line card. B. No acknowledge tone, bad line card. C. Bad communicator.
<ul style="list-style-type: none"> IF DATA RECEIVED, BUT No. 685 HANGS UP BETWEEN MESSAGES: 	<ul style="list-style-type: none"> A. Cut ORANGE jumper on line card (see Diagram 5). B. Bad communicator. C. Bad line card.
<ul style="list-style-type: none"> IF COMMUNICATOR TRANSMITS BEFORE ACKNOWLEDGE TONE: 	See "Handshake Modification Option (Section VII D).
<ul style="list-style-type: none"> PRINTER LIGHT ON No. 685 FLASHING. MANUAL LIGHT ALSO FLASHING 	<ul style="list-style-type: none"> A. ON LINE (SEL) light on No. 786 Printer is off. B. Printer out of paper. C. Printer cord disconnected. D. AC Power for Printer out or Fuse blown. E. Turn power to printer off, then on. F. No. 685 AUTO/MANUAL switch in MANUAL position.
<ul style="list-style-type: none"> NO MESSAGES BEING PRINTED BY PRINTER. 	<ul style="list-style-type: none"> A. Check DATE SET/TIME SET switch on No. 685. Should be OFF. B. Depress SYSTEM RESET switch on No. 685. C. Turn printer power switch off, then on.
<ul style="list-style-type: none"> TIME NOT ADVANCING. TIME COLON NOT FLASHING. 	Depress SYSTEM RESET switch on No. 685.
<ul style="list-style-type: none"> CLOCK RUNNING FAST (50 SECONDS PER MIN.) MONTH/DAY REVERSED. 	No. 691 PROM on memory card missing, reversed or incorrectly programmed for 50 Hz operation.
<ul style="list-style-type: none"> CLOCK CANNOT BE SET. SYSTEM RESET SWITCH NOT OPERATING. 	Check ribbon connector at rear of flip-down panel. May be disconnected.

Symptom	Probable Cause and/or Recommended Action
. NO ENGLISH LANGUAGE ON PRINTER.	<p>A. No. 691 PROM was not enabled for this line card position (see Section VI C and PROM CHART 3).</p> <p>B. No. 691 PROM on memory card inserted backwards.</p> <p>C. Check memory card's No. 691 PROM's programmed message selection with No. 690 Programmer.</p>
. BATTERY TEST FAILURE.	<p>A. Battery disconnected.</p> <p>B. Battery voltage reaching No. 685 must be at least 11.2 VDC.</p> <p>C. Battery wiring too long or gauge too small.</p> <p>D. Battery fuse on No. 685 blown (15A, No. 90-15).</p>
. BATTERY BOILING OUT "WATER".	Connect D.C. voltmeter across battery. Voltage should be 13.5 - 13.7 VDC. Contact Ademco's Inside Sales Dept. in Syosset, NY for technical assistance.

X. GENERAL SPECIFICATIONS

A. No. 685 Digital Alarm Receiver:

Physical: Width: 19" (48.3 cm)
Height: 6-7/8" (17.5 cm)
Depth: 21" (53.3 cm)
Weight: 41.4 lbs. (18.8 kg) (less line cards)

Electrical:

Voltage: 120V.AC @ 2A (without line cards); 60 Hz [or optional 220V.AC, 50 Hz for (non-UL listed applications)].

Standby: 12V. DC, 55 AH (min.) battery (not supplied).
Current: 2.5A max. with one line card
5 A max. with eight line cards

A 12V, 55 AH maintenance-free battery (such as Globe GC 12550) provides at least 9 hours standby.

For UL Fire applications, the standby power requirement is at least 4 hours if a generator is available, and at least 24 hours if no generator is available (in the latter case, the use of three 12V, 55 AH batteries in parallel is recommended).

For non-UL applications: If a standby generator is available, a 5 AH, 12V sealed lead-acid battery (such as Ademco No. 630) can be used (No. 630 provides 15 - 20 minutes standby).

AC Power Fuse: 3A Slo-blo (No. 90-10)
Battery Fuse: 15A (No. 90-15)

B. Printer and Computer* Interface Specifications:

The SERIAL PRINTER*, EXTENSION printer* and COMPUTER* outputs are set up with the following parameters.

* Not relevant to UL 864 listed fire alarm monitoring.

Note: Use of a serial printer interface is not recommended. See subsection C for parallel printer information.)

Baud Rate: 600

1 Start Bit

7 Data Bits

1 Parity Bit forced to 0

1 Stop Bit

Serial Printer Busy: May be set up to read either pin 11 or 20, as required.
Busy = Negative (-) voltage. Ready = Positive (+) voltage.

Extension Printer Busy: Pin 20 is used.

A PRINTER FAILURE message will be triggered if the printer is not ready for a period greater than 1 second.

Data Pin 3
Ground Pin 7

COMPUTER PIN CONNECTIONS:

2 Received Data from Computer.
3 Transmitted Data to Computer.
7 Signal Return (Ground).
20 Computer Ready.

Computer Format, asynchronous, ASCII, EIA RS232C compatible.

Low Speed: LF S S Ø S S S S Ø A CR
High Speed: LF S S Ø S S S S Ø C C C C Ø C C C C Ø C CR
4+2: LF S S Ø S S S S Ø A₁ A₂ CR or LF S S Ø S S S S Ø D D D a

CR = Carriage Return
LF = Line Feed
Ø = blank
S = Acct # digit
A = Event code
C = Channel codes
DDD = (16xA₁) + A₂
a = ASCII "A"

- Notes:**
1. Only verified messages are sent to the computer. Non-verified messages result in a TRANSMISSION ERROR message (see Section IV E 2).
 2. An option is available to process ACK and NACK signals and periodic status request signals from a computer (see Section XI).

C. Parallel Printer Pin Connections:

Pin	Connection	Pin	Connection
1	Data Strobe	6	Data Bit 5
2	Data Bit 1	7	Data Bit 6
3	Data Bit 2	8	Data Bit 7
4	Data Bit 3	11	Printer Busy
5	Data Bit 4	16	Signal Ground

Note: Some printers require that their pin 9 (Data Bit 8) be connected to pin 16 (Signal Ground).

Use of double shielded parallel cable with metal shell connectors between the No. 685 and the printer(s) is recommended (e.g. Ademco No. 686-2).

D. Message Formats - Data Frequency and Pulse Rate

ADEMCO Low Speed Format:	Data Frequency = 1900 Hz Pulse Rate = 10 pulses per second
ADEMCO High Speed Format:	Standard Touch-Tone frequencies @ 10 digits per second
SESCOA/Radionics Format:	Data frequency = 1800 Hz Pulse Rate = 20 pulses per second
RADIONICS Superfast Format:	Data Frequency = 1800 Hz Pulse Rate = 40 pulses per second
RADIONICS BFSK:	Data Frequency = 1800 Hz, 2100 Hz Baud Rate = 50

XI. COMPUTER INTERFACE

A. Improved ACK/NACK Protocol Features:

1. After completion of message transmission to the computer via the RS232 interface, the No. 685 will wait up to 2 seconds for an ACK character to be returned by the computer. If the ACK is received, transmission of subsequent messages is enabled.
2. If a NACK response is received or no ACK is received within 2 seconds, the No. 685 will retransmit its message to the computer. In addition, the messages will be re-printed on the optional printer (No. 786) along with the letter "R" (located ahead of the receiver #, to indicate a repeated transmission). For example:

6:30PM 3/15 R 13 8531 1555 5555 7 (V) Burglar Alarm

3. If an ACK is not received within 2 seconds after the second transmission, the computer or computer link is assumed to be in a faulted condition. The "Computer Failure" LED on the No. 685 will light and a computer failure message will appear on the No. 685 display and the printer (if used). There is an option to force the No. 685 into the MANUAL mode upon computer failure (see Section III B7).
4. If the computer is in a fault condition, messages will still be sent to the computer. However, only one transmission per message will occur. Once an ACK is received within 2 seconds after a transmission, the "computer fault" condition will be cancelled and a "computer restore" message will be triggered.
5. Each time the computer transmits the character "S" to the No. 685, the No. 685, if operating properly, will respond with the message:

LFOO%OKAY%CR
within 5 seconds.

After sending the OKAY @ message, the No. 685 will ignore additional "S" characters from the computer for a period of 10 seconds.

In addition, the following options have been added:

B. Computer Options:

1. **Ready Line/ACK/NACK Select:** When this option is selected, the No. 685 will use the ACK/NACK handshake protocol as a method of determining the computer status. If the option is not selected, the computer Ready Line (Pin 20) will be monitored.
2. **Carriage Return/Escape Character:** The No. 685 may be programmed to output an ESCAPE character (ESC - ASCII 1B Hex) instead of the Carriage Return that normally terminates a transmission to the computer.
3. **MANUAL Mode on Computer Failure:** As an option, the No. 685 may be set up to enter the MANUAL mode in the event of a computer failure. It will revert to the AUTO mode upon computer restore.

If a printer is present, it is possible to override this function using the OFF-COM DIP switch (switch #7 located below the 1RG-2RG DIP switch on the front flip-down panel).

4. **Periodic Test Message:** This option, when selected, will cause the No. 685 to send a test message to the computer if no regular messages have been sent to the computer for a period of time (45 seconds approx.). This option, when used with the new handshake protocol (ACK/NACK option in Item 1 above), allows the computer and the No. 685 to monitor each other.
5. **Alert Tone Silencing:** When this option is selected, the alert tone will only be triggered for No. 685 system messages and line fault messages (RCVA, RCVB, and LINE groups). Alarm messages that will be handled automatically by the computer will not trigger the alert, thus

freeing the operator from the task of silencing the No. 685. In the event of a computer failure or a switch to the MANUAL mode, the alert tone will be triggered for all messages.

NOTE: If the "Pulse Relay" option (See Section VI B 8) has been chosen, the remote alert relay will activate for 2 seconds on ALL messages. This will allow a remote alert sounder to be used at the computer console while reserving the internal alert sounder for system messages only.

THE ALERT TONE SILENCING OPTION WILL ONLY FUNCTION IF THE OFF-COM DIPSWITCH IS IN THE COM POSITION.

6. **Selection of computer output formats for 4-2 messages:** When a 4-2 message is received, the computer output will normally be in 4-2, which is:

RG ACCT EI

where R is Receiver number
G is the line card Group or rotary number
ACCT is the Account number
E is an Event code
I is the Zone identifier

In order to interface to the Ademco CAPS computer system, an optional output format, CAPS 4-2, is required. It is:

RG ACCT DDDA

where DDD is a 3-digit decimal number in the range 0-255
A is an ASCII "A" character

The value of DDD is calculated as follows:

$$DDD = (16 \times \text{Event code}) + \text{Zone identifier}$$

For Hex event codes, the following numbers are used:

B = 11, C = 12, D = 13, E = 14, F = 15

Example: Input Message = 12 3456 F4

$$DDD = 16 \times 15 (F) = 240 + 4 = 244$$

The message 12 3456 244A would be sent.

To select the CAPS output format, check box 7 in PROM CHART 7 and follow the programming procedure in Section VI C steps 34 - 37.

In addition, the standard codes for opening and closing by user (B0-BF and C0 - CF respectively) must be translated to Ademco HI speed for the CAPS system. Whenever a 4-2 code beginning with B is received, an opening report is sent. The user # will be set to match the zone identifier of the message.

Users are encouraged to use codes B and C for open and close. For

those who use B and C for other messages, an option has been provided in the 685 Memory Board's option PROM to disable the automatic translation.

To disable translation of codes B0 - BF and C0 - CF, check Box 8 of PROM CHART 7 and follow the programming procedure in Section VI C steps 34 - 37.

WARNING

THE LIMITATIONS OF THIS RECEIVING SYSTEM

While this Receiver is part of an advanced design central station monitoring system, it does not offer guaranteed protection against burglary or fire. Any Receiver is subject to compromise or failure to warn for a variety of reasons:

- The Receiver will not work without power. Devices powered by AC will not work if their AC power supply is off for any reason, however briefly, and their back-up batteries are missing, dead, or not put in properly.
- Telephone lines needed to receive an alarm signal from a premises to a central monitoring station may be out-of-service or temporarily out-of-service. Telephone lines are also subject to compromise by sophisticated methods of attack.
- This equipment, like other electrical devices, is subject to component failure. Even though this equipment is designed to last as long as 10 years, the electronic components could fail at any time.

The most common cause of a receiving system not functioning when an intrusion or fire occurs is inadequate maintenance. This Receiver, therefore, should be tested daily to make sure that it is working properly.

Monitoring an alarm system may make a subscriber to the service eligible for lower insurance rates, but alarm system monitoring is not a substitute for insurance. Homeowners, property owners and renters should continue to insure their lives and property.

APPENDIX

RADIO DIAGNOSTIC INFORMATION

When Code 0 appears in the ninth channel position, as indicated in Table B: Channel Status Codes (High Speed Format), subscriber installation radio test information will be reported in the previous eight channels (but not sent to the computer output). The test message will contain the following information:

- a. Subscriber identification (account number).
- b. The number of the Master Station receiving the alarm.
- c. The signal strength of the received message.
- d. Whether the subscriber's transmitter modulation level is correct.
- e. Whether the radio transmitter's frequency is correct.

This information is used by the Central Station during subscriber installations to verify that at least two Master Stations or Network Nodes are receiving messages from the subscriber. These messages are transmitted automatically when a Test PROM is inserted in a Subscriber Interface Module.

The test message is in the following form:

c c c c n 0 0 0 s 0 m f 0

where: cccc is the subscriber account number

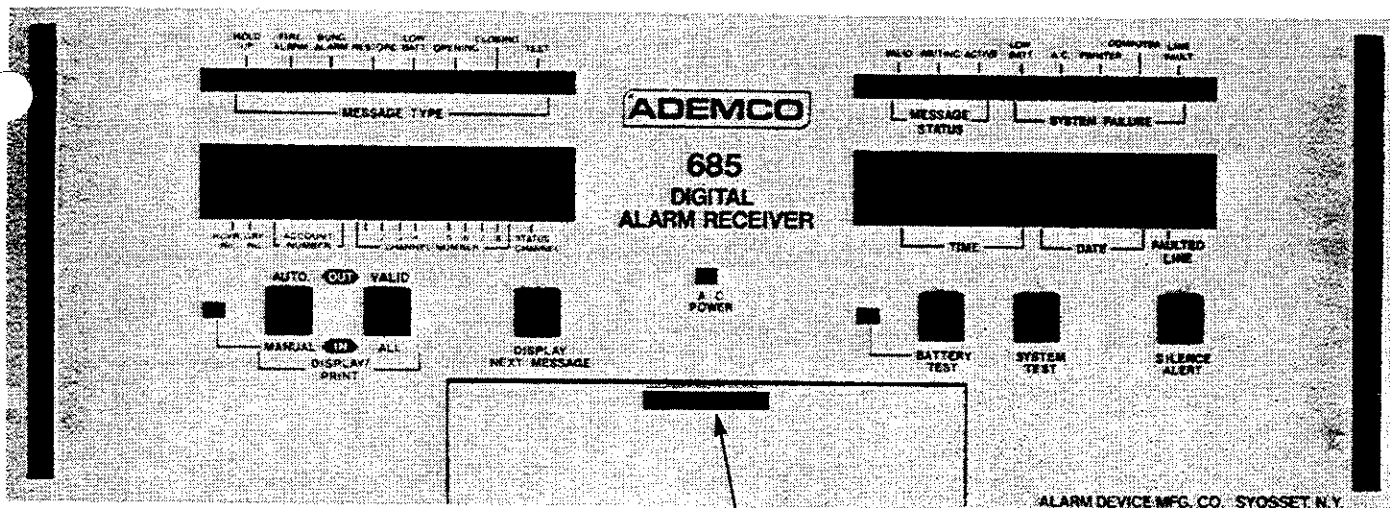
n is the number of the Master Station receiving the alarm. This number can be 1 to 15, using hexadecimal notation (1-9, and A-F to represent 10-15).
Appears in channel 1 position.

s is the signal strength of the received message. This number can be from 0 to 10 (10 being indicated by an "A", which is highest).
Appears in channel 5 position.

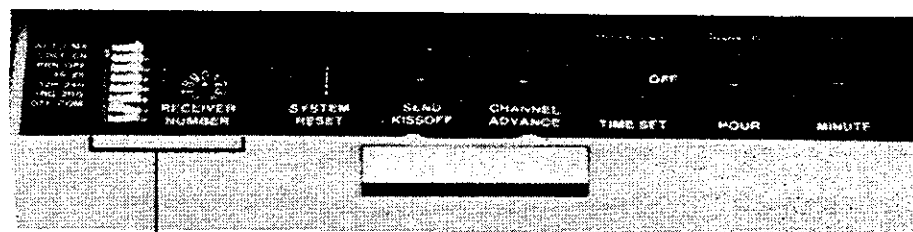
m is the modulation level
0 = OK
1 = modulation is low
2 = modulation is high
Appears in channel 7 position.

f is the radio frequency
0 = OK
1 = frequency is low
2 = frequency is high
Appears in channel 8 position.

Note: Channels 2, 3, 4 and 6 of the eight reporting channels are not used for radio test information at the present time, and a 0 (zero) will therefore appear in these channel positions.



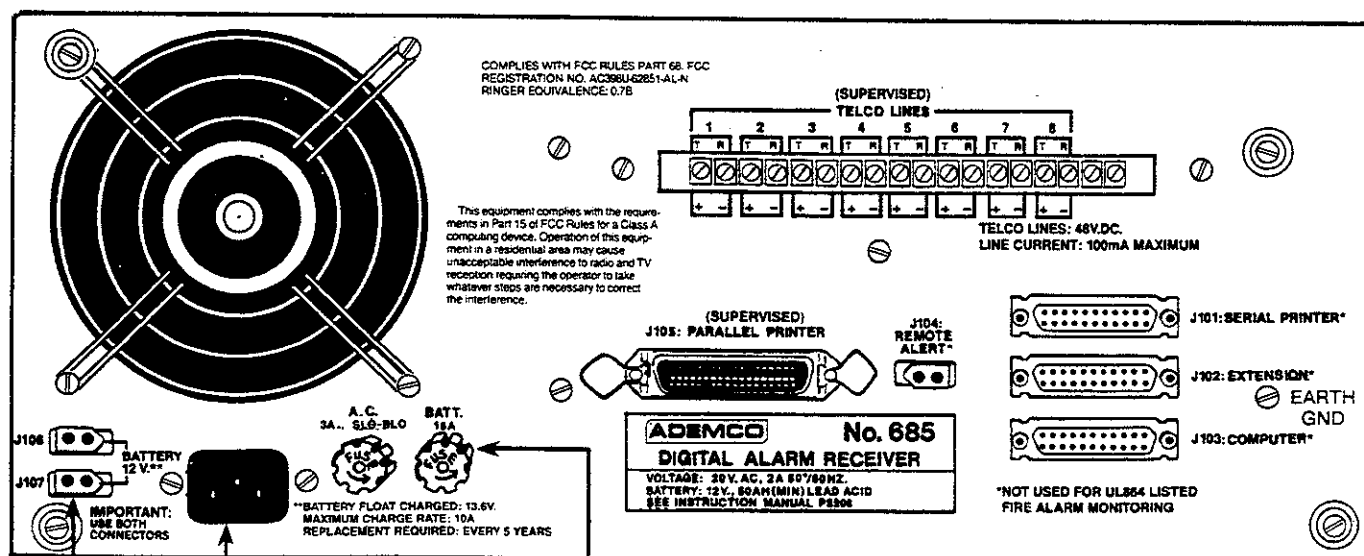
PULL HANDLE TO OPEN



DIPSWITCHES

CONTROLS
INSIDE
FLIP-DOWN
PANEL

Diagram 1: FRONT VIEW OF NO. 685



FUSES

AC POWER CONNECTOR

STANDBY BATTERY CONNECTORS

Diagram 2: REAR VIEW OF NO. 685

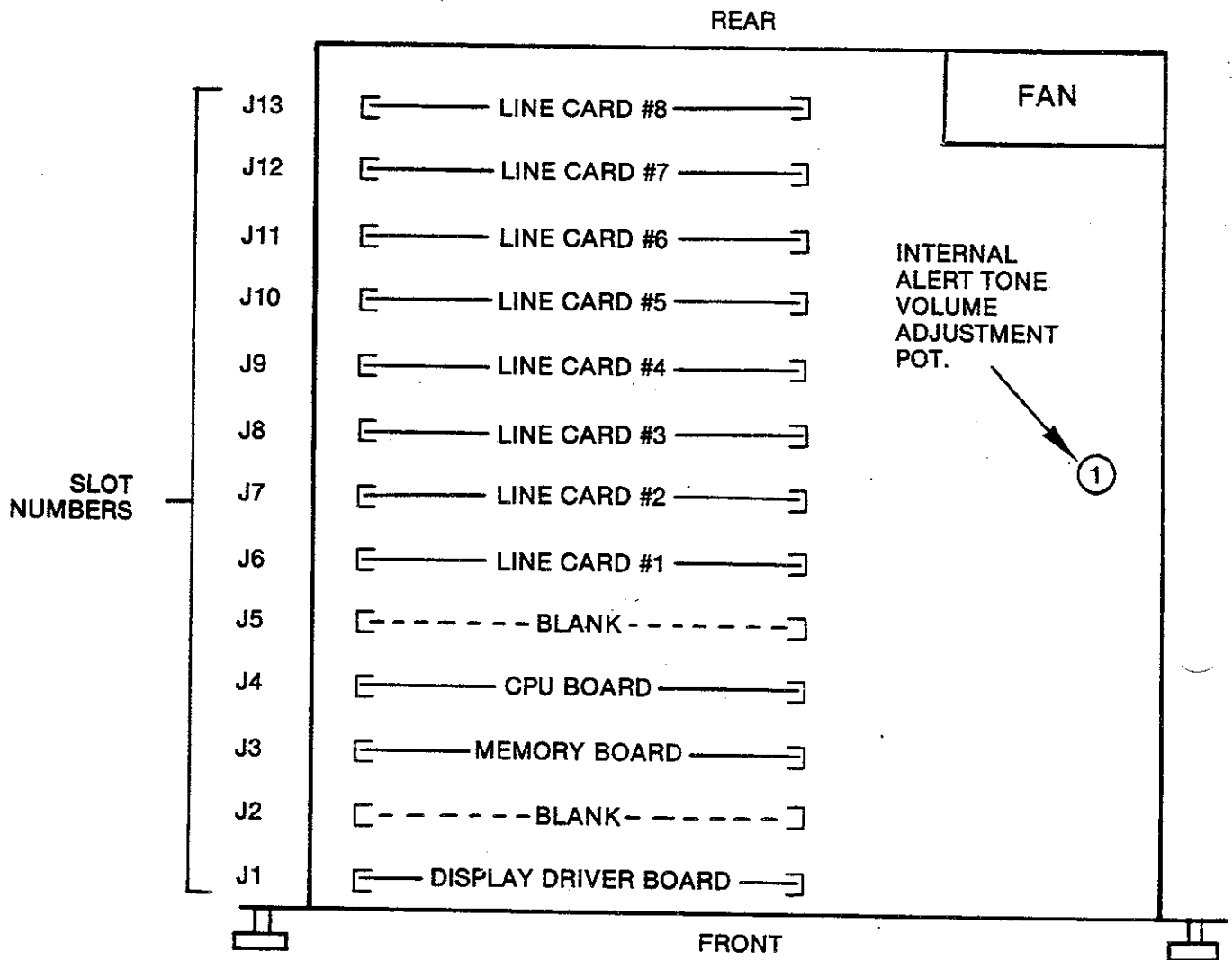


Diagram 3: TOP VIEW OF NO. 685
 (Shown with cover removed and 8 line cards installed)

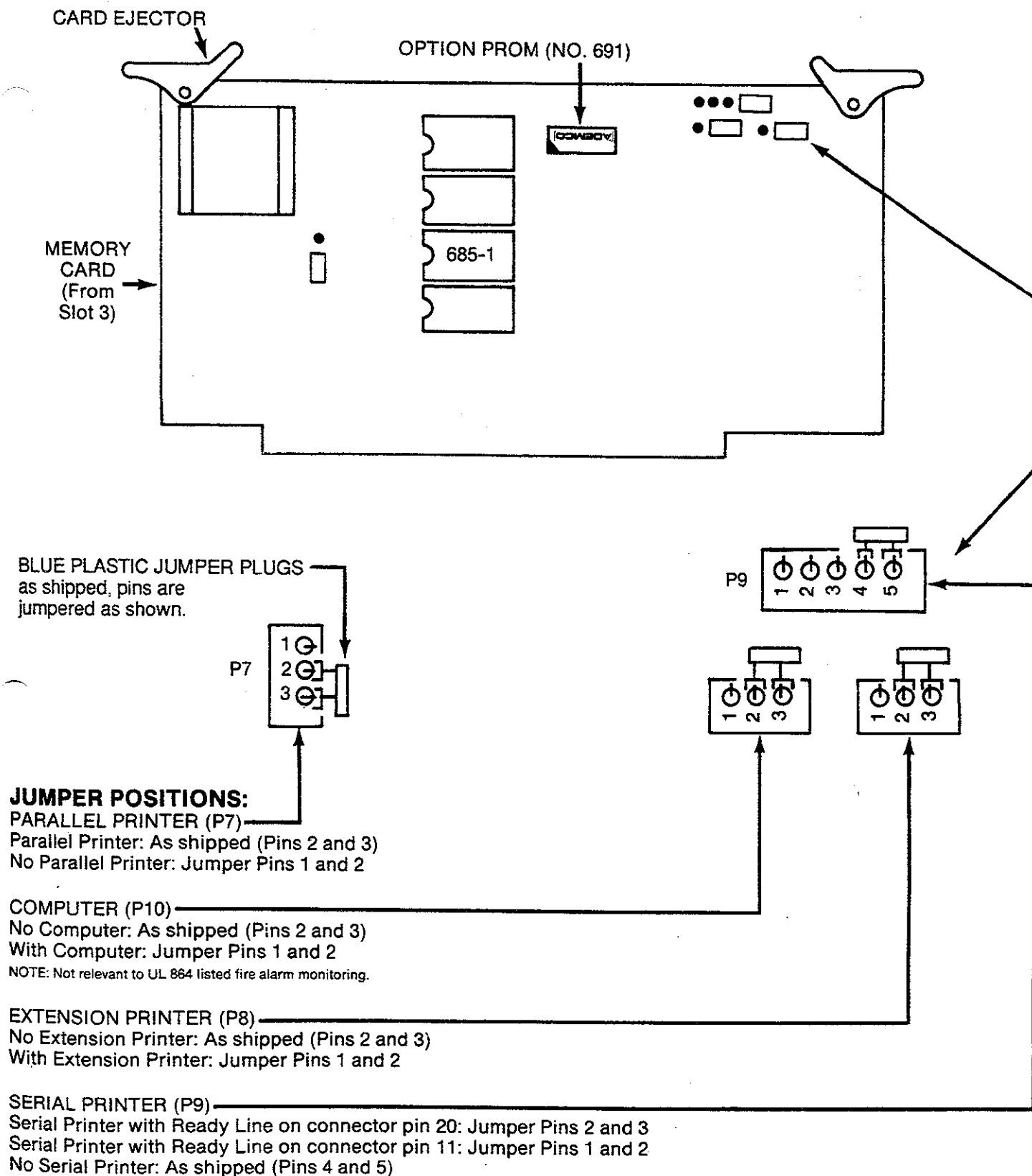
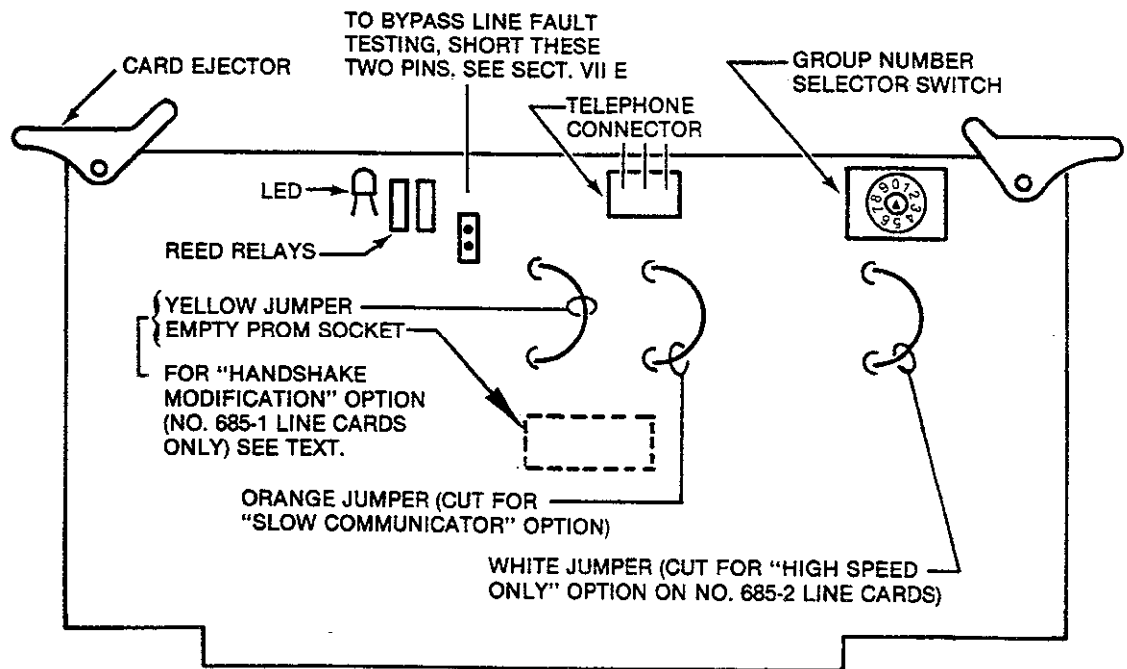


Diagram 4: MEMORY CARD



AVAILABLE LINE CARDS:

- No. 685-1 Line Card, Ademco LOW SPEED Format
- No. 685-2 Line Card, Ademco HIGH/LOW SPEED Format
- No. 685-3 Line Card, SESCOA Format
- No. 685-4 Line Card, Radionics Format
- No. 685-5 Line Card, Long Range Radio
- No. 685-8 Multi-Format Line Card
- No. 685-9AT Line Card, Derived Channel

Diagram 5: TYPICAL LINE CARD

THE 120V ELECTRICAL CONNECTION OF THE RECEIVER MUST MEET CLASS 1 WIRING REQUIREMENTS. ONE METHOD OF MEETING THESE REQUIREMENTS IS SHOWN IN THE FOLLOWING DIAGRAM:

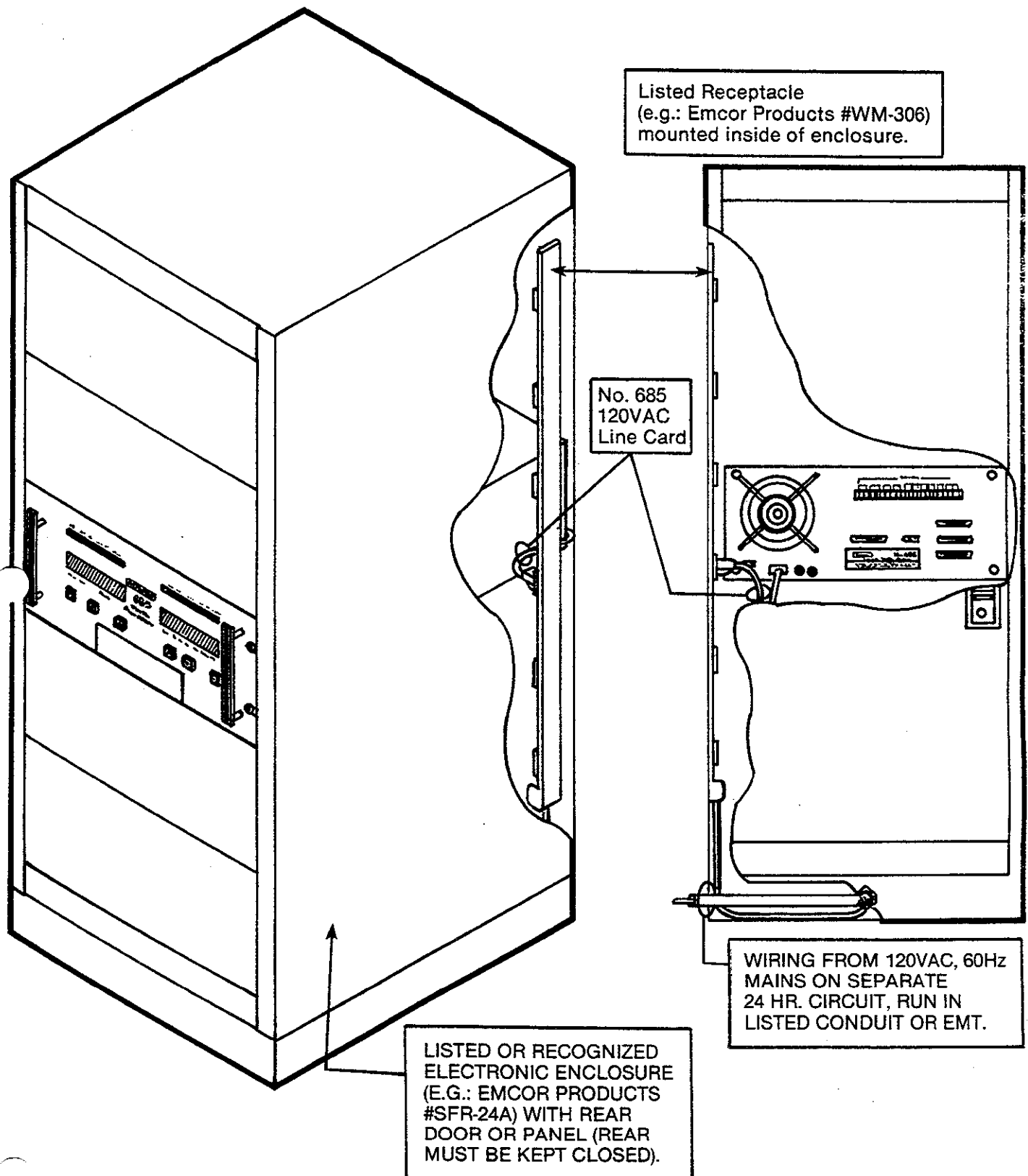


Diagram 6: ELECTRICAL CONNECTIONS




**CHARTS FOR PROGRAMMING NO. 685's OPTION PROM (NO. 691)
UTILIZING NO. 690 FROM PROGRAMMER**

PROM CHART 1: ENGLISH LANGUAGE MESSAGE SELECTION				
CHANNEL # (HIGH SPEED) OR ALARM CODE (LOW SPEED)	HIGH SPEED		LOW SPEED	
	*MESSAGE#	AND MESSAGE	*MESSAGE#	AND MESSAGE
	(From Table D in Instructions)		(From Table D in Instructions)	
1				
2				
3				
4				
5				
6				
7				
8				
9	NOT USED		**	

**Include all leading zeroes in message #. If no message desired, select "01".*

***Restricted to single digit message # (1 to 9). Omit leading zeroes. If no message desired, enter "1".*

Enter message #'s and messages from table D in instructions.
High speed and low speed selections can be different or similar.

PROM CHART 2: ENGLISH LANGUAGE MESSAGE PROGRAMMING																				
PHONE NUMBER SWITCH SETTING 	ROTARY SWITCH SETTING																SUB'S ID# 			
	*ACCESS#				*MAIN#															
PRIMARY (1st Digits)																	**			
SECONDARY (2nd Digits)																				
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	9	
	HIGH SPEED CHANNELS									LOW SPEED ALARM CODES										

**Insert all leading zeroes. If no message desired, program "01".*

***Restricted to single digit (1 to 9). If no message desired, program "1"*

Follow PROM programming procedure in instructions.

PROM CHART 3: LINE CARD ENGLISH LANGUAGE ENABLING

1 2 3 4 5 6 7 8

← OPTION/CHANNEL SELECTION SWITCHES
ON NO. 690

--	--	--	--	--	--	--	--

- Check line card #'s to be enabled.
- Follow PROM programming procedure in instructions, with No. 690's rotary switch on RESTORE and checked switches "up".

PROM CHART 4: LINE CARD "ZONE ENGLISH" LANGUAGE OPTION SELECTION

Applicable only to No. 685-2 Line Cards operating in HIGH SPEED format (No. 685-4 Line Cards automatically yield "Zone English" output if enabled via PROM chart 3).

1 2 3 4 5 6 7 8

← OPTION CHANNEL SELECTION SWITCHES
ON NO. 690

--	--	--	--	--	--	--	--

- Check No. 685-2 Line Card #'s to be enabled.
Note: Line cards must also be enabled via PROM chart 3).
- Follow PROM programming procedure in instructions, with No. 690's rotary switch on 16 SEC. DELAY and checked switches "up".

PROM CHART 5: REMOTE ALERT DELAY SELECTION (Skip if Pulse Relay Option is to be selected.)

1 2 3 4 5 6 7 8

← OPTION/CHANNEL
SELECTION SWITCHES
ON NO. 690

				NOT	USED		
--	--	--	--	-----	------	--	--

- At table to right, circle desired remote alert delay time.
- Check corresponding switch #'s on chart above. **Note:** No programming is required for 1 sec. time delay.
- Follow PROM programming procedure in instructions, with No. 690's rotary switch on SECONDARY # ONLY and checked switches "up".

*No programming required for
1 sec. delay

TIME DELAY (Sec.)	SWITCH #			
	1	2	3	4
* 1	NONE			
5	✓			
10		✓		
15	✓	✓		
20			✓	
25	✓		✓	
30		✓	✓	
35	✓	✓	✓	
40				✓
45	✓			✓
50		✓		✓

PROM CHART 6: OPERATING OPTION SELECTION							
1	2	3	4	5	6	7	8
							NOT USED
50 Hz	Eur Cal	Auto A.C.	Test Msg.	Pulse Relay	300 Baud	1200 Baud	

OPTION/CHANNEL SELECTION SWITCHES ON NO. 690.

← OPTIONS

BAUD RATE IS 600 IF NEITHER OR BOTH ARE SELECTED.

a. Check desired options on chart above.

b. Follow PROM programming procedure in instructions, with No. 690's rotary switch on OPEN/CLOSE and checked switches "up".

PROM CHART 7: COMPUTER OPTION SELECTION							
1	2	3	4	5	6	7	8
					NOT USED		

OPTION/CHANNEL SELECTION SWITCHES ON NO. 690.

← OPTIONS

ACK/NAK

Escape Character

Manual Mode on Failure

Test Computer

Alert Tone Silence

CAPS 4-2 Output for 4-2 Messages (do not set to send a 4-2 message to the Ademco/MAS computer)

Inhibit Translation of 4-2 Codes B&C to High Speed Ademco

a. Check desired options on chart above

b. Follow PROM programming procedure in instructions, with No. 690's rotary switch on INVERTED and checked switches "up"

PROM CHART 8: CODE 9 RESTORE REPORT TRANSLATION							
1	2	3	4	5	6	7	8

OPTION/CHANNEL SELECTION SWITCHES ON NO. 690.

a. Check line card numbers for which translation of Code 9 Restoral Reports into Ademco High Speed is to be enabled.

b. Follow PROM programming procedure in instructions, with No. 690's rotary switch in position 5 (labelled SYS.OPTIONS) and checked switches "up".

PROM CHART 9: LINE CARD 3-1 WITH CHECKSUM ENABLING

1	2	3	4	5	6	7	8

← OPTION/CHANNEL
SELECTION SWITCHES
ON NO. 690.

- a. Check line card numbers for which 3-1 with checksum reports are to be enabled.
- b. Follow PROM programming procedure in instructions, with No. 690's rotary switch in position 12 (labelled NOT USED) and checked switches "up".

LIMITED WARRANTY

Seller warrants its products to be in conformance with its own plans and specifications and to be free from defects in materials and workmanship under normal use and service for 18 months from the date stamp control on the product or for products not having an Ademco date stamp, for 12 months from date of original purchase unless the installation instructions or catalog sets forth a shorter period, in which case the shorter period shall apply. Seller's obligation shall be limited to repairing or replacing, at its option, free of charge for materials or labor, any part which is proved not in compliance with Seller's specifications or proves defective in materials or workmanship under normal use and service. Seller shall have no obligation under this Limited Warranty if the product is altered or improperly repaired or serviced by anyone other than Ademco factory service. For warranty service, return product transportation prepaid, to Ademco Factory Service, 165 Eileen Way, Syosset, New York 11791.

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