# B1225E EXPANDER

# INSTRUCTION MANUAL

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**BARNETT ENGINEERING LTD.**

#215, 7710, 5th St. S.E.
Calgary, Alberta
T2H 2L9
(403)255-9544
www.barnett-engg.com

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# *1  OPERATION*

## 1.1 GENERAL

The B1225E Alarm Expander Unit is an 8-input, 4-output board which expands the number of alarm inputs and relay outputs.  The expander boards connect to the B1225 ARU and to each other via a serial cable.  All of the programmable features of the B1225E are controlled by the B1225 master, such as debounce time, relay on/off codes, DTMF on/off codes, input polarity and voice messages.

The maximum number of expander boards which may be added to one B1225 ARU is seven.  Each expander has a binary address controlled by a DIPswitch on the board.  The four relay contacts available for remote control respond to DTMF codes received over the radio by the master (B1225 ARU).

## 1.2 ALARM TRANSMISSION

When an alarm goes into an "active" state or a timer expires, the B1225 ARU goes through the transmission sequence described in the B1225 operator's manual: transmitting the master site ID, master alarms, expander ID, and alarm conditions.  The expander(s) will send out the DTMF-on code and voice messages until the alarm returns to normal;then the DTMF-off code is sent.  A different DTMF code can be programmed for each input, providing eight DTMF on and eight DTMF off sequences in total.

## 1.3 RELAY CONTROL

The four relay outputs are controlled through the master.  By programming the "Relay on code" and "Relay off code", as shown in the programming section, the B1225E's relays can be remotely controlled.

When the master receives a Relay On (or Off) code over the radio system, it will turn the corresponding expander relay on (or off) and transmit over the radio system the relay number and new condition.

## 1.4 MEMORY STORAGE

The B1225E holds all of its operating parameters in battery backed up RAM.  Internally, all operating parameters are stored in two separate memory locations:  a working space and a redundant storage space.  Both memory spaces are protected by a security code, ensuring that all information is valid.  Should one piece of data become corrupt in either of the data spaces, it is automatically replaced with the valid data from the other location.

If a major error occurs and both the working and the storage data spaces have been corrupted, the B1225E will signal the master to reset all parameters concerning the expander to default values.  At this point the announcement "(SITE ID) - PROGRAM x CODE ERROR" is made (x representing the number of the expander with the major errors).

Security codes and the RAM redundancy affect only the operating parameters and are not used for the stored site identifier or alarm voices.

## 2  INSTALLATION

The B1225E should be mounted in a clean, dry area suitable for electronic equipment.  All connections, except for the signaling cables, are made to the compression screw terminals TB1 and TB2.  TB1 handles all of the inputs and power, while TB2 contains the relay contacts.

An 11 to 16 volt, negative ground power supply capable of delivering 200 mA is required.  If the AC supply/battery back-up option is used, connect the red wire to TB1-1 and the black wire to TB1-9.  The ground terminal is also used in a common reference for the alarm inputs.

The signaling cables between the master and the expanders  connect from  SERIAL OUT on one board to SERIAL IN on the next.  This provides communication between the master and the expanders.

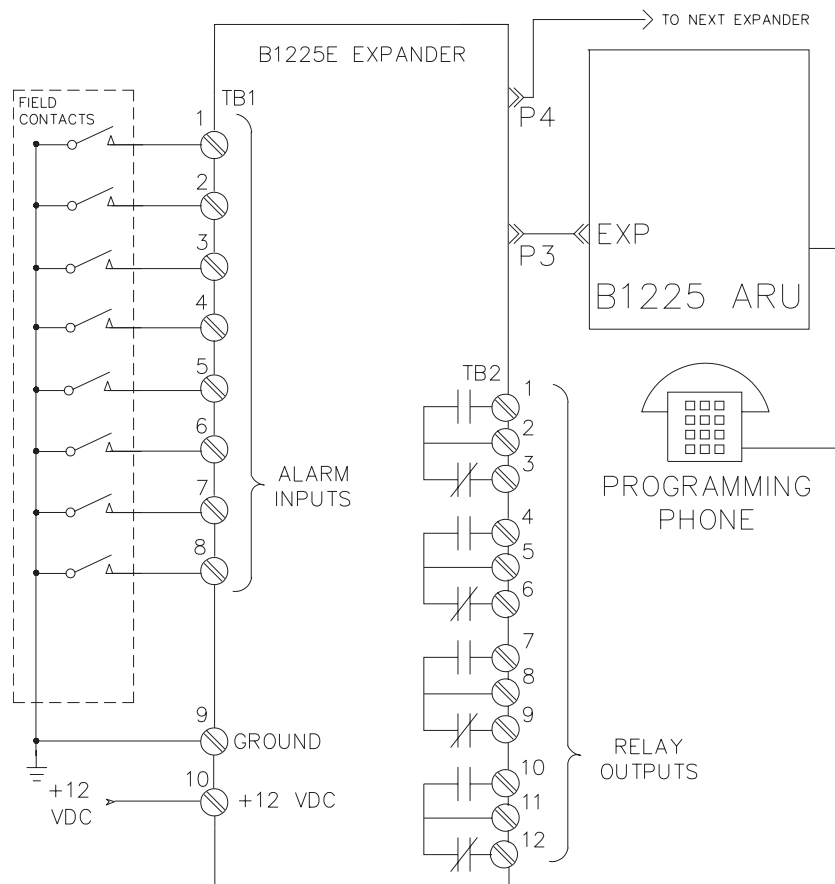Refer to diagram Figure 1 for wiring instructions.



Figure 1  Installation Wiring

**POWER**  TB1-9 Neg.   TB1-10 position
The B1225E requires 11 to 16 VDC, negative ground to operate.  Typical operating current is 100 mA, but may increase if all relays or LEDs are on.  *Connect power to the board only after all other connections have been made.*

**ALARM INPUTS**  TB1-1 thru TB1-8

The external dry relay contacts, representing the alarms, are connected to terminals 1 to 8 inclusive.  These optically coupled inputs sense alarm activity by either a closure to ground or an open circuit.  Programming options select either normally open (NO) or normally closed (NC) alarm contacts.  The alarm ground must be the same as the power ground.  Do not apply any voltage source to the input terminals.  Active current on each input is 100 mA.

**RELAY OUTPUTS**  TB2

Four form C relay contacts are available on TB2.  Table 1 shows the connections available at each pin.  The relays are controlled by receiving DTMF digits from the radio system (through the master) that correspond to its internally programmed parameters.  Refer to the programming section for further details.

| TB2 | FUNCTION | |
|-----|----------|---------|
| 1 | NO contact | |
| 2 | common | Relay 1 |
| 3 | NC contact | |
| 4 | NO contact | |
| 5 | common | Relay 2 |
| 6 | NC contact | |
| 7 | NO contact | |
| 8 | common | Relay 3 |
| 9 | NC contact | |
| 10 | NO contact | |
| 11 | common | Relay 4 |
| 12 | NC contact | |

TABLE 1   RELAY CONNECTIONS

**SERIAL IN / SERIAL OUT PORTS**  P3, P4

Connections from the master to the expander and between expanders are made to P3 and P4 using a shielded single cable conductor.  This connection allows data to be transferred between the master and the expanders.

*ALWAYS power up both the expander and ARU together AFTER this communication cable has been connected.  Failure to do so could cause damage to one or both units.*

## EXPANDER DIPSWITCH SETTINGS

Expander addressing and the LEDS are controlled by DIPswitch SW1.

SW1-1 to SW1-3 are used for expander addressing.  Expanders must be numbered sequentially from 1 to 7.  The address is configured as follows (X indicates OFF) :

SWITCH

| 1 | 2 | 3 | 4 | 5 | 6 | ADDRESS |
|---|---|---|---|---|---|---------|
| X |   |   |   |   |   | 1 |
|   | X |   |   |   |   | 2 |
| X | X |   |   |   |   | 3 |
|   |   | X |   |   |   | 4 |
| X |   | X |   |   |   | 5 |
|   | X | X |   |   |   | 6 |
| X | X | X |   |   |   | 7 |

If an expander address is changed, the unit must have power removed and then reapplied in order for the master to recognize its new address.  All the expander's programmed parameters, aside from the voice messages, will reset to the default parameters when its address is changed and will have to be re-programmed.  When the expander is powered back up, "Program code error" will be announced, indicating that the expander was reset.  Only the expander with the changed address will reset.  The master and the rest of the expanders will retain their programmed parameters.

SW1-8 is used to turn the LEDs on and off.  SW1-4, SW1-5, SW1-6,and SW1-7 are not used.

## 3 PROGRAMMING

### 3.1 GENERAL

The B1225E is programmed by the B1225 master unit. The features which are programmable in the B1225E are the voice messages, polarity of inputs , debounce time, DTMF on/off codes and the relay on/off codes.

The B1225E will be shipped with either the default parameters or the factory testing codes and can be programmed to each operator's individual requirements.

Program data is stored in a battery protected RAM with a 30 day retention period. After 30 days without external power, the ARU may lose its programmed data and revert to the default state. The contents of the RAM may be are periodically altered. An error detected at any RAM address will result in default operation. The default conditions used are shown at the end of this section.

Before any expanders can be programmed, the B1225 ARU must be configured for the total number of expanders connected (program code 10). Refer to the B1225 Operations Manual to change this parameter.

If an expander number is not configured in the master B1225, or an expander is not present that has a programmed address, attempts to program the expander will generate the message "ERROR, ENTER PROGRAM CODE".

### 3.2 PROGRAMMING SEQUENCE

If the B1225E has never been programmed or has lost its memory, the site identifier and all alarm messages will be simply noise. This noise may be very loud, depending on hardware adjustments. USE CAUTION when listening to the programming parameters, especially initially, as loud noise may be given as the stored voice.

When you connect your Touch Tone telephone into the program port of the B1225 ARU and take it off hook, the "Enter program code" message will be announced. At this point, the master and expanders can be programmed. To begin programming expander number X, enter: # X program code ✶✶.

> Example: You are at the main menu and you want to change the debounce times
> (program code 5) on the first expander (address 1) to 3 seconds.
>
> ARU: ENTER PROGRAM CODE
> YOU: # 1 ✶✶
> ARU: ALARM DELAY IS 0.5 SECONDS
> YOU: 3 0 ✶✶
> ARU: ALARM DELAY IS 3.0 SECONDS
> YOU: ✶✶

*The following pages describe the B1225E programming features available along with examples.*

## PROGRAM CODE

The program code is the highest level programming menu.  From here, the different functions of the ARU can be selected using the program code.  Use the codes found here in conjunction with the programming manual for the B1225.

PROGRAM CODES ARE:

| | |
|---|---|
| # X 1 ✱✱ : | SITE ID AND ALARM VOICE MESSAGES FOR EXPANDER X |
| # X 4 ✱✱ : | DTMF ON/OFF SIGNALING TAGS FOR EXPANDER X |
| # X 5 ✱✱ : | ALARM DELAY TIME FOR EXPANDER X |
| # X 6 ✱✱ : | ALARM FORMAT FOR EXPANDER X |
| # X 8 ✱✱ : | RELAY CONTROL TAGS FOR EXPANDER X |
| # X 9 ✱✱ : | RELAY FORMAT FOR EXPANDER X |

Each of these codes is described in the following:

## # X 1✱✱ :  VOICE MESSAGES

The site identifier and each of the 8 alarm inputs are programmed for the expander in this section.  The alarm messages are identified as X.1 to X.8 instead of 1 to 8 in the master B1225.

*An un-programmed voice message will be heard as a loud static noise.  DO NOT hold the telephone directly to your ear when programming these messages for the first time.*

Example:  You want to program the site identifier in the first expander to say
“Delta Compressor”

ARU:   ENTER PROGRAM CODE
YOU:   # 1 ✱✱ (selecting voice message)
ARU:   NUMBER 1 SITE IS EMPTY
YOU:   ✱✱ (selecting change)
ARU:   BEEP - (record light comes on)
YOU:   (speaking)  DELTA COMPRESSOR
ARU:   NUMBER 1 SITE IS DELTA COMPRESSOR
YOU:   ✱✱
ARU:   ALARM NUMBER 1.1 IS EMPTY (on to the alarm messages)

## # X 4✱✱ :  DTMF ON/OFF SIGNALLING TAGS

The DTMF on and off strings will be programmed for the expander specified.  As in the voice message programming section, the expander and alarms will be announced as X.1 to X.8.  For complete programming refer to the B1225 manual.

Example:  You want to program the second input in expander 1 to have a DTMF ON code of 123 and an off code of 456.

ARU:   ENTER PROGRAM CODE
YOU:   # 1 4 ✱✱

```
ARU:   ENTER ALARM NUMBER
YOU:   **
ARU:   ALARM NUMBER 1.2 DTMF ON CODE IS EMPTY
YOU:   1 2 3 **
ARU:   ALARM NUMBER 1.2 DTMF ON CODE IS 1 2 3
YOU:   **
ARU:   DTMF OFF CODE IS EMPTY
YOU:   4 5 6 **
ARU:   DTMF OFF CODE IS 4 5 6
YOU:   **
```

## # X 5 ∗∗ : ALARM DEBOUNCE TIME

Alarm delay time (debounce time) can be set for each expander and must be between 0.1 and 9.9 seconds.  One debounce time is used for all of the inputs on a particular expander.  Each expander may have a different time.  The input must remain active for this period of time in order for it to be considered a change of state.

```
Example:  The debounce time for expander 2 is to be set at 3 seconds.

ARU:   ENTER PROGRAM CODE
YOU:   # 2 5 **
ARU:   NUMBER 2 ALARM DELAY IS 0.5 SECONDS
YOU:   3 0 **
ARU:   NUMBER 2 ALARM DELAY IS 3.0 SECONDS
YOU:   **
```

## # X 6 ∗∗ : ALARM FORMAT

Each alarm input on an expander can be programmed to be Normally Open (N.O. - requiring a ground closure to become active) or Normally Closed (N.C. - requiring a release from ground to become active).  The ALARM FORMAT must be a 0 for N.O. contacts or a 1 for N.C. contacts.

```
Example:  The inputs for expander two are to be set for normally closed inputs.

ARU:   ENTER PROGRAM CODE
YOU:   # 2 6 **
ARU:   NUMBER TWO ALARM FORMAT IS 0
YOU:   1 **
ARU:   NUMBER TWO ALARM FORMAT IS 1
YOU:   **
```

## # X 8 ∗∗ : RELAY CONTROL TAGS

The four relays on each expander can have DTMF on and off codes programmed for remote control.  They will be announced as relay numbers X.1 to X.4 .  The master will interpret DTMF strings from the radio system as ON or OFF controls for the relays.  Each string may be up to 8 characters.

Example:  The control codes for the output relays in expander one are to be programmed.  The first relay will have an ON code of 789 and an OFF code of 321

```
ARU:   ENTER PROGRAM CODE
YOU:   # 1 8 ✶✶
ARU:   RELAY NUMBER 1.1 DTMF ON CODE IS EMPTY
YOU:   7 8 9 ✶✶
ARU:   RELAY NUMBER 1.1 DTMF ON CODE IS 7 8 9
YOU:    ✶✶
ARU:   RELAY NUMBER 1.1 DTMF OFF CODE IS EMPTY
YOU:   3 2 1 ✶✶
ARU:   RELAY NUMBER 1.1 DTMF OFF CODE IS 3 2 1
YOU: ✶✶
```
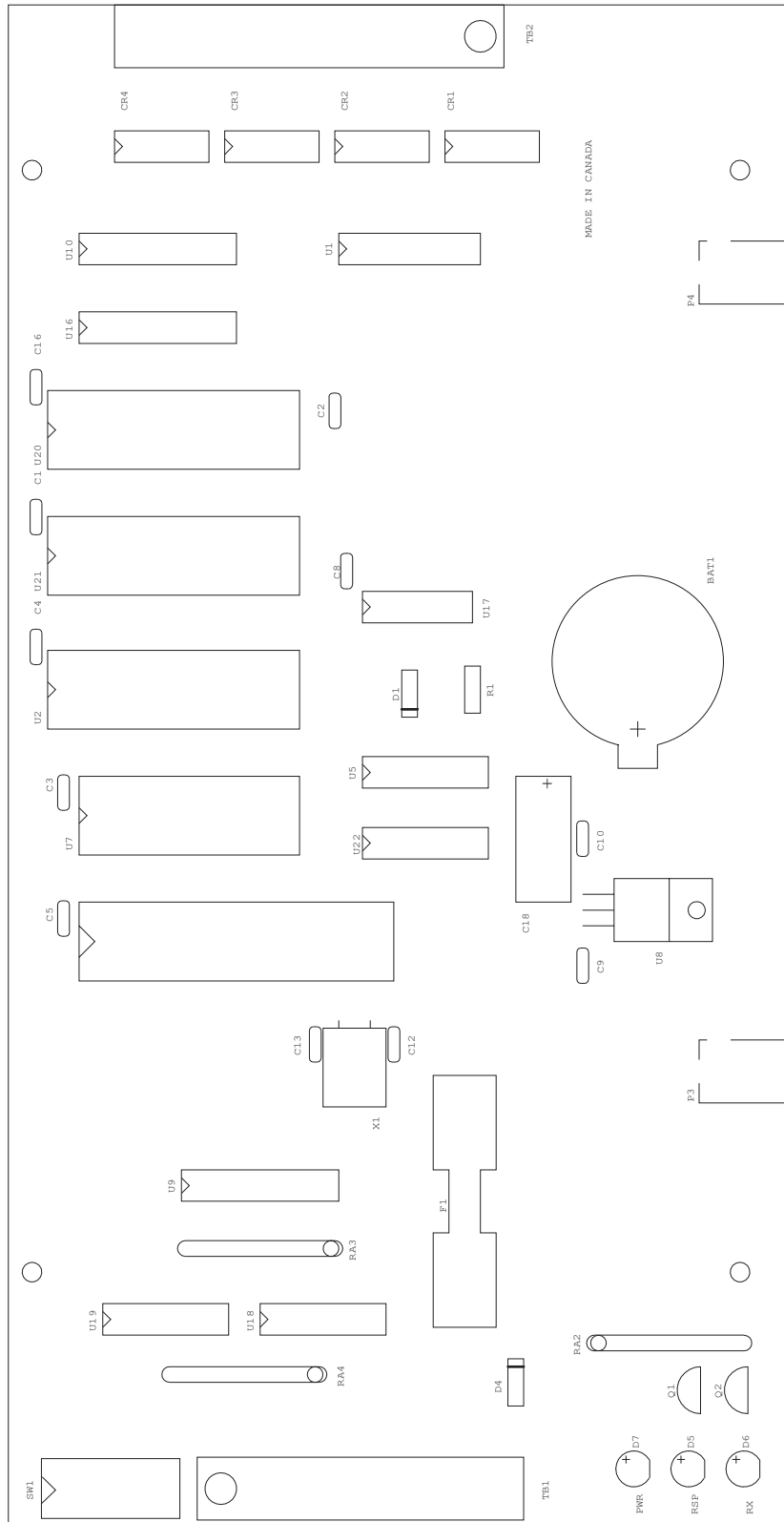
## # X 9 ✶✶ : RELAY FORMAT

This will specify the type of relays being used for each expander.  The relays will be announced as X.1 to X.4.  Each relay may be of a different format. (0=standard, 1=latched, 2=timed).

Example:  Relay one in expander one is to be set as a timed relay.

```
ARU:   ENTER PROGRAM CODE
YOU:   # 1 9 ✶✶
ARU:   RELAY  NUMBER 1.1 FORMAT IS ZERO
YOU:    ✶✶
ARU:   RELAY NUMBER 1.1 FORMAT IS TWO
YOU:    ✶✶
```

## *5 WARRANTY*

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