> **WARNING: DEVIATION FROM THESE INSTALLATION INSTRUCTIONS MAY LEAD TO IMPROPER ENGINE OPERATION WHICH COULD CAUSE PERSONAL INJURY TO OPERATORS OR OTHER NEARBY PERSONNEL.**

1.0 DESCRIPTION

1.1   The Altronic CPU-95 terminal program operates from an IBM-compatible PC and permits the operator to program a CPU-95 for a standard or custom configuration. With the Altronic CPU-95 Terminal software, the user can take full advantage of the capability designed into the CPU-95 system. Through the RS-485 serial link the user can monitor ignition operation or adjust operating parameters. Offset timing on an individual cylinder basis and advanced features can be programmed.

1.2   The following Altronic material is required:

CPU-95.MEM   Memory program software, Altronic CPU-95 System
                          (1.44 Mb 3.5" diskette)

1.3   The following user-supplied hardware is required:

Computer: IBM-compatible PC, 386/486/P5 CPU, 512K RAM
                         Hard drive (1 Mb of free disk space required),
                         1.44 Mb floppy drive, 1 RS-232 serial port,
                         VGA graphics with color or monochrome monitor

Serial Converter: RS-485 to RS-232 Serial converter for PC interface.
                         Two wire, half duplex, multidrop, binary communications,
                         RTS controlled.

2.0 SOFTWARE INSTALLATION

2.1   The program will execute only from a hard drive. A minimum of 1 meg of free disk space is required. In the instruction below, it is assumed the floppy diskette drive is "drive a:" and the hard drive is "drive c:". Different designators may be used.

2.2 Insert the program disk into drive a: and follow these steps:
A. At the a:\> prompt type **install**; press **ENTER**.
B. At the screen prompt, verify you want to install the program by pressing **Y**.
C. Select the drive where the program is to be installed; use the arrow keys to highlight your choice and press **ENTER**.
D. When prompted on screen, change the directory to **c:\>CPU95** by typing **CD\CPU95**, then press **ENTER**.
E. Then type the program execution command: **CPU95-C** and press **ENTER**. (c:\CPU95>**CPU95-C**.)
NOTE: The CPU95-C program operates with 791955-16 model only.

3.0 RS-485 WIRING

3.1 The CPU-95 ignition module MUST NOT be connected to both a CPU-95 display module and a PC at the same time. When the ignition system is connected to a PC for configuration or remote monitoring, the display module must be disconnected.

3.2 An RS-232 to RS-485 converter is required to have the PC communicate to the ignition module. See drawing 709 969 for the required connections.

3.3 In order to program the EEPROM, the shutdown input of the ignition system MUST be grounded. (Step 7.1, A., 19). See drawing 709 969 for details.

4.0 PROGRAM OPERATION

4.1 Flashing HELP comments are displayed on the bottom line of the screen for all menus and screens. If the HELP line is overwritten, press the **SPACE BAR** to redisplay it. The **UP/DOWN** cursor keys or **TAB/SHIFT-TAB** will move the cursor between fields.

4.2 LOAD PROGRAM: Once installed, to load the program, follow steps 2.2 D. and E.

4.3 PROGRAM CONTROL SCREEN: Following the opening pictorial screen, the Program Control screen appears. Type in your initials or code. NOTE: Pressing **ESC** at this screen will result in exiting the program to the DOS level.

4.4 SELECT COMMUNICATIONS MENU: Select the PC communications port to which the RS-485 Converter will be connected (COM1, COM2, COM3, COM4).

4.5 Select the node number of the CPU-95 (791955-16) ignition system to which you want to communicate. The default node number is 1. If only one CPU-95 is connected on the serial link, the user can retrieve the programmed node number from the CPU-95 by pressing **F5**.

4.6 MAIN MENU - 4 Options.
    A.   MONITOR - allows the operator to monitor current engine status.
    B.   ADJUST - allows the operator to adjust engine operating parameters.
    C.   SETUP - allows the operator to program the CPU-95 EEPROM.
    D.   EXIT PROGRAM - quits program and exits to DOS.

5.0 PROGRAM OPERATION - MONITOR MODE

5.1 MONITOR MENU - 4 Options.
    A.   IGNITION STATUS - allows the operator to monitor current ignition status.
    B.   INDIVIDUAL TIMING - allows the operator to monitor individual cylinder timing.
    C.   SPARK DIAGNOSTICS - allows the operator to view coil and spark plug diagnostics.
    D.   RESET IGNITION - clears Diagnostic and Overspeed faults.

5.2 The communication link will be established and the decoded binary serial data will be displayed on the screen.

5.3 Pressing **ESC** will take the user back to the Main Menu.

6.0 PROGRAM OPERATION - ADJUST MODE

6.1 ADJUST MENU - 5 Options:
    A.   GLOBAL RETARD - adjust manual mode retard.
    B.   INDIVIDUAL CYLINDER TIMING - set as needed.
    C.   ENERGY - allows the operator to adjust the ignition energy setting:
        1.   E1 - 75 millijoules
        2.   E2 - 100 millijoules
        3.   E3 - 125 millijoules
    D.   MULTI-STRIKE - allows the operator to adjust the ignition multi-strike setting:
        1.   On - system operates in double-strike mode.
        2.   Off - system operates in single strike mode.
    E.   SPARK DIAGNOSTICS - allows the operator to adjust the spark diagnostic setpoints:
        1.   LOW SPARK VOLTAGE   - range 0-255, typical 100
        2.   HIGH SPARK VOLTAGE   - range 0-255, typical 180
        3.   NO SECONDARY SPARK - range 0-255, typical 255

6.2 Pressing **ESC** will take the user back to the Main Menu.

7.0 PROGRAM OPERATION - PROGRAM CPU-95

7.1 SETUP MENU - 7 Options:

A. ENGINE - To select engine model and program the CPU-95 EEPROM:
   1. Select Engine Model - Select the CAT Engine model from scroll box. Use the **UP/DOWN** cursor keys to highlight your choice, then press **ENTER** to select it.
   2. Programming EEPROM - The shutdown lead must be grounded to program the EEPROM. Follow the instructions on the screen to complete the programming cycle and return to the Main Menu.

B. USER LABEL - These fields are to store site specific data in the EEPROM. Engine location, number and model, can be stored along with two lines of user comments.

C. OVERSPEED - Select the desired overspeed RPM. The range is 0 to 2550 RPM.

D. PROTECTION ON/OFF - Turn EEPROM protection ON or OFF.

E. NODE NUMBER - Enter the node number of the unit to be programmed. Values can be 1 to 254. Multidrop 485 can connect to several CPU-95 systems on a daisy chain serial link when display modules are not used.

F. SPECIAL FEATURES - Select multistrike and/or energy setting below 250 rpm.

G. TEST MODE - Enable Test Mode.

8.0 TROUBLESHOOTING

8.1 COM485 ERROR.
   A. RS232-RS485 Converter not connected or not working.

8.2 NO REPLY IN 13 mSec.
   A. CPU-95 node selection incorrect.
   B. CPU-95 not connected.
   C. CPU-95 not powered.

8.3 FILE NOT FOUND.
   A. Obsolete program disk. Call factory for update.

> **NOTE: ALL MEMORY CONFIGURATIONS SHOULD BE VERIFIED BY OPERATION WITH THE IGNITION SYSTEM AND AN IGNITION TIMING DEGREE WHEEL PRIOR TO USE ON AN OPERATING ENGINE.**

CPU-95 IGNITION MODULE

SHUTDOWN IN	MISC. IN	ALARM OUT	FAULT OUT	FIRE CONFIRM OUT	COMMON OUT	SERIAL RS485 +	SERIAL RS485 −	SHIELD				GEAR TOOTH P.U.(RED)	GEAR TOOTH P.U.(BLACK)	CABLE SHIELDS	RESET P.U.(RED)	RESET P.U.(BLACK)	CABLE SHIELD	SWITCH +	SUPPLY +	COMMON −	24 VDC +	GROUND −
IN		PANEL OUT				COMMUNICATIONS						MAGN. PICKUPS					4-CYCLE P.U.				POWER	
1	2	3	4	5	6	7	8	9	10	11	12	A	B	S	A	B	S	A	B	C	+	−

USER INPUT,
CLOSE TO PROGRAM
EEPROM.

NOTE:
USE SHIELDED
CABLE FOR RS485
CONNECTIONS

NOTE: THE CPU-95 IGNITION MODULE **MUST NOT BE**
CONNECTED TO BOTH A CPU-95 DISPLAY MODULE AND
A PC AT THE SAME TIME. WHEN THE IGNITION SYSTEM
IS CONNECTED TO A PC FOR CONFIGURATION OR REMOTE
MONITORING, THE DISPLAY MODULE MUST BE DISCONNECTED.

BLACK BOX NONPOWERED
SHORT HAUL MODEM
P/N ME721A-F

BLACK BOX CORP.
P.O. BOX 12800
PITTSBURGH, PA. 15241
1-412-746-5500

1. JUMP RXA TO TXA THEN CONNECT
   TO RS485 − ON CPU-95 IGN. MOD.
2. JUMP RXB TO TXB THEN CONNECT
   TO RS485 + ON CPU-95 IGN. MOD.
3. SWITCH ON SHORT HAUL MODEM
   SHOULD BE SET TO DCE.

TXA TXB RXA RXB

SHORT HAUL
MODEM

P/N ME721A-F

TO COMPUTER RS-232 PORT

REVISIONS				TOLERANCES (EXCEPT AS NOTED)	ALTRONIC INC.

NO.	DATE	BY	DESCRIPTION
1			
2			
3			
4			
5			

TOLERANCES (EXCEPT AS NOTED)

DECIMAL
.XXX − ±.005
.XX − ±.010

FRACTIONAL

MATERIAL

TITLE

WIRING DIAGRAM,
PC CONNECTION, CPU-95 IGN. MOD.

DRAWN BY	RY	SCALE	NONE	PART NUMBER
CHECKED BY		DATE	2-20-96	709 969
APPROVED BY				