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**AEXX-354 SERIES LARGE DISPLAYS**  
**WITH THE RS232 COMMUNICATIONS OPTION**

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**AEXX-354 SERIES LARGE DISPLAYS WITH THE RS232 COMMUNICATIONS OPTION  
REV 09/18/00**

**DESCRIPTION**

AEXX-354 Series Large Displays are available with 1", 2.3", 4", 8", or 12" high digits, visible from 5 feet to 500 feet away. They are available in 2, 3, 4, 5, and 6 digit versions. These AE Series Large Displays can be controlled by another device by communicating via RS232 programming.

This manual covers all AE Series displays from two to six digits, including two-sided versions with the RS232 Communications Option (354) installed. It will use the term "the AE DEVICE", in some cases to cover all versions of displays.

The model numbers of the AEXX-354 Series are derived from the digit size and the number of digits in the display, followed by the 354 suffix. For example the AE24-354 is 2.3 inch, four-digit display and the AE126-354 is a twelve inch six digit display. For two-sided versions, the model number would have /2. For example: AE84/2-354 would be the model number for a Two-Sided, Eight Inch, Four Digit Large Display. Each AE Display can be configured in a number of ways. Some will have different enclosures. For more information on your specific model number refer to the drawings included at the back of this manual.

For multiple display system the Master/Driver Option (348) can be added. This option allows you to connect up to 40 remote displays to the AEXX-354 Series Display for displaying the same information in many locations.

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**SPECIFICATIONS**

Digits: 1, 2,3, 4, 8 and 12 Inch High, Seven Segment Digits are available. For additional digit specifications, see the drawings at the back of this manual for your specific model.

Function: Receives control and data information. Modes are provided for sending ASCII characters and numbers, for setting time of day in 12 or 24-hour format, and for controlling Up and Down counting elapsed timers.

Power: 120 VAC – The power required varies with the size and number of digits. Optional power includes 50 HZ, 12 VAC, 12 to 15 VDC and 220 VAC.

Battery backup: Self-charging, Ni-Cad.

Signal required: 2 wire RS232 (receive only)  
2400 baud, no parity, 8 data bits, 1 stop bit.

Enclosure: Black anodized aluminum with .118" thick red acrylic lens. The back panel is .125" thick black, ABS plastic. The size varies with the size and number of digits. See the drawings at the back of this manual.

A 1210-0101 mounting bracket is provided for wall mounting to a single or double gang box. Optional enclosures are available.

Wiring: Clearly labeled, pigtail lead wires (#18 AWG) are provided. Optional terminal blocks, power cords, and connectors are available.

Sample programs and drawings are provided at the back of this manual for more detail.

Options: There are numerous options available. Some include: (/2) Two Sided Version, (348) Master/Driver Output, (376) Relay Output, and (PC8) Add 8 FT. Power Cord. When options are ordered, supplemental information is provided with addenda and additional drawings.

***For all other options refer to the drawings at the back of this manual for additional specifications.***

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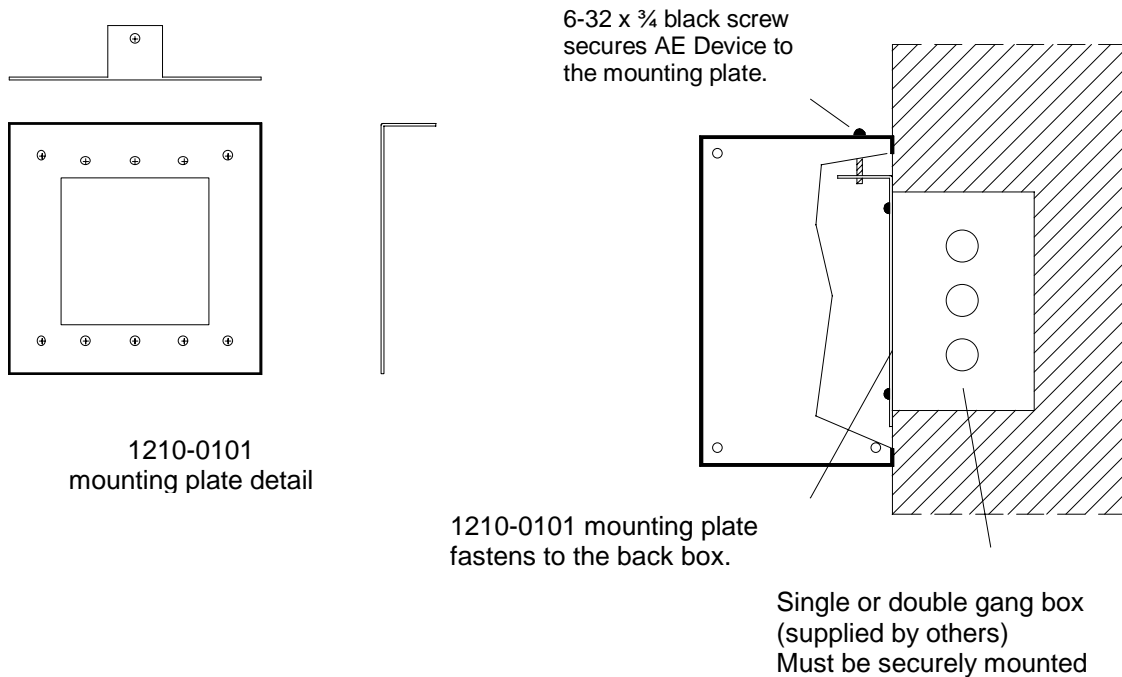
**INSTALLATION**

**SETTING THE DISPLAY ADDRESSES**

Each display has its own specific address, so they can be addressed independently by the users' program. A rotary switch is provided on each controller for setting the addresses. Valid addresses are 0 to 15 (0-9, A, B, C, D, E, F on the rotary switch) with 0 being an all call address. To set the addresses, the back panel must be removed to gain access to the controller. See the drawings for more details. Addresses can be specified with the order and set at the factory. If you are writing your own control program, be sure to include the address in the 10-byte message sent by the host device.

**MOUNTING**

The AE Series Displays can be mounted in a variety of ways. Things to consider for mounting include ambient light, viewing area, ambient temperature, dirt or dust. Most models are supplied with one or more 1210-0101 mounting brackets for wall mounting to a single or double gang box. See the detail below. For other mounting options, such as ceiling mounts or double-sided mounts, refer to the specific drawings.

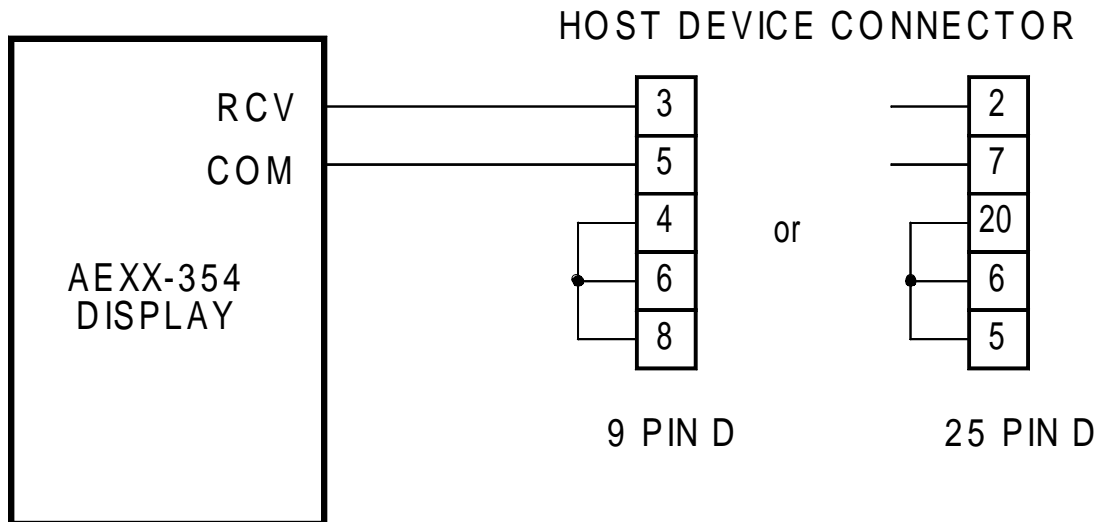


**WIRING**

There are many wiring configurations for the AEXX-354 Series Large Displays, depending on the functions used and the options installed.

On most standard units, clearly labeled pigtail leads wires are provided for the power at the back panel of the unit. Additional pigtail leads are provided for the RS232 Input signal. Some models such as the Bezel Mount versions may have terminal blocks for the field wiring. For other options, refer to the addendum sheets provided for that option. Also, see the wiring diagrams for more detail at the back of this manual.

RS232 WIRING DIAGRAM



2400 BAUD, NO PARITY, 8 DATA BITS, 1 STOP BIT

Connect the RS232 output from the host computer or system to the wires labeled "RCV" and "COM". The connector at the host computer must be wired and have the jumpers as shown above.

Some versions will have terminal blocks labeled "REC" and "GND" for the RS232 input signal. These are located on the circuit board assembly. "REC" is the same as "RCV" and "GND" is the same as "COM".

SEE THE FOLLOWING SECTION ON THE RS232 OPTION AND THE SAMPLE PROGRAMS AT THE BACK OF THIS MANUAL FOR MORE DETAIL.

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**RS232 COMMUNICATIONS OPTION**

**DESCRIPTION**

The AE Series RS232 Communications option allows AE Series devices to communicate with host computers, process computers (PLC'S), industrial instruments, and other equipment with RS232 output ports. With the 10-byte instruction format multiple units can be connected in parallel and addressed individually or as a group. Up to 15 unique addresses plus an all call address (0) are available. The 10-byte instruction also provides mode selection, sends 6 characters, and sets display attributes. The host computer or controller can have complete control of all the digits and functions of the AE device with simple or complex programs that can output data via an RS232 serial port.

AE Series devices are available in many configurations with digit sizes of 1", 2", 4", 8", and 12" high. They can have as few as 2 digits and as many as 6 digits per device. Multiple controllers can be used to provide displays with more than 6 digits. Systems can be assembled using AE devices of various digit sizes and numbers of digits and other AE options to meet a variety of applications.

Typical applications include:

Master clock systems for schools, churches, factories, boardrooms, museums, theaters, and other facilities. Easily interfaces with other systems such as time-and-attendance systems, UCT time systems, and other master clock systems.

Multiple clock/timer systems where time of day and elapsed timers are needed, such as radio and TV studios, recording studios, process control centers, etc.

Process indicators and enunciators to display process variables and alarm conditions from PLC'S and other process controllers. Display production counts, quotas, and procedures. Prompt operators and maintenance people.

Visual call systems for paging mothers to the nursery at church, for paging doctors and nurses, for calling maintenance personnel. Call trucks to a loading point or scales.

Message centers to display advertisements, messages of the day, etc.

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**OPERATION**

Before applying power, be sure all wiring is completed. Apply power to the unit. The displays will rotate during the power on self-test and then it will flash a version, until data is received. If a charged battery is installed, the self-test will be bypassed.

A 10-byte instruction is required to communicate with the AE Series device. The first byte, byte 0, is the preamble. It establishes communications with the AE device. The second byte, byte 1, is the address byte that is used for addressing up to 15 different addresses and an all call address. Byte 2 is the mode byte. Up to 256 modes are possible providing complete control of all the 7 segment characters and functions of the AE Series products. Bytes 3 through 8 are associated with the six, 7-segment displays of the AE Series device. Byte 9 is the miscellaneous digit, which provides attributes such as colons, AM/PM indicators, flash, etc.

BYTE 0:           START CHARACTER - An 11H is required to establish communications.

BYTE 1:           ADDRESS BYTE - Range is from 0 to 15. Used for addressing individual devices. Address 0 is an ALL CALL address.

Set the address using the Mode Switch (SW1) located on the CPU board. Switch position 0 is address 0 and switch position F is address 15. See the drawing at the back of this manual for more detail.

BYTE 2:           MODE BYTE - Range is from 0 to 255. This byte provides complete control of all AE Series devices with the RS232 option installed. The modes are:

MODE 0 - ASCII character mode. The AE device will display the AE ASCII characters sent in bytes 3 through 8. See the AE ASCII character set at the back of this manual.

MODE 1 - Number mode. The AE device will display the numbers 0 to 9 sent in bytes 3 through 8.

MODE 2 - Graphic character mode. The AE device will display the AE graphic characters sent in bytes 3 through 8. See the AE graphic character set at the back of this manual.

MODE 3 - 12 Hour Time/timer mode. Bytes 3 through 8 are set as the time, and time keeping begins.

MODE 4 - 24 Hour Time/timer mode. Bytes 3 through 8 are set as the time, and time keeping begins.

MODE 5 - Count down timer mode. Bytes 3 through 8 are set as the preset value to count down from.

MODE 6 - Displays the software version installed in the AE device.

MODE 7 – Presets a Day Counter. Bytes 3 through 8 preset the number of days to start from. S3 must be tied low and a 1N914 diode must be installed in the PD8 position on the circuit board assembly. Time is set using Mode 4. The count is incremented by one everyday at Midnight.

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MODES 8 - 255 are for future use.

BYTES 3 - 8: SIX CHARACTER BYTES - AE devices can have up to 6 digits. The six characters received are for displaying on these six digits. These characters will depend on the mode byte, byte 2, that precedes them. They provide the words for messages, the digits for setting time and variable, and even 7-segment graphic characters.

BYTE 9: MISCELLANEOUS DIGIT BYTE - This byte provides colons, AM/PM indicators, and other attributes such as display flashing.

BIT 0 - Turns on the AM/PM indicator.

BIT 1 - Turns on the colons. Colons are automatically turned on in the time/timer mode, i.e. byte 2 = 3.

BIT 2 - If equal to 1, stops count down timer. If equal to 0, starts count down timer.

BIT 3 - If equal to 0, count down timer begins from preset value entered in bytes 3 through 8. If equal to 1, count down timer begins from where it previously was stopped.

BIT 7 - Flash display.



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**SET TIME (SAMPLE PROGRAM)**

```
5 REM 232TIME.BAS SETS TIME IN AN AE DEVICE WITH RS232 OPTION
6 REM WRITTEN BY JIM RECCELLI, APPLIED TECHNICAL SYSTEMS, 1/22/94
10 OPEN "COM1:2400,N,8,1" AS 1
20 H1$=MID$(TIME$,1,1)
30 H2$=MID$(TIME$,2,1)
40 H1H2$=MID$(TIME$,1,2)
45 PRINT H1H2$
46 IF VAL(H1H2$)=22 THEN H1$="1":H2$="0":GOTO 60
47 IF VAL(H1H2$)=23 THEN H1$="1":H2$="1":GOTO 60
50 IF VAL(H1H2$)>12 THEN H1H2=VAL(H1H2$)-12:
H1H2$=STR$(H1H2):H1$=MID$(H1H2$,1,1):H2$=MID$(H1H2$,2,1):PRINT H1H2$,H1H2
60 PRINT TIME$
70 M1$=MID$(TIME$,4,1)
80 M2$=MID$(TIME$,5,1)
90 S1$=MID$(TIME$,7,1)
100 S2$=MID$(TIME$,8,1)
120 PRINT#1, CHR$(0);CHR$(0);CHR$(17);CHR$(0);CHR$(3);H1$;H2$;M1$;M2$;S1$;S2$;CHR$(0)
130 CLOSE 1
140 END
```

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**COUNT DOWN TIMER (SAMPLE PROGRAM)**

```
1 REM PROGRAM NAME IS "CDDEMO.BAS" DEMONSTRATES COUNT DOWN TIMER (RS232)
2 REM JIM RECCELLI 1/8/95.
10 OPEN "COM1:2400,N,8,1" AS #1
100 INPUT "ENTER COUNT DOWN TIME HHMMSS      ",CD$
110 H1$=MID$(CD$,1,1)
111 H2$=MID$(CD$,2,1)
112 M1$=MID$(CD$,3,1)
113 M2$=MID$(CD$,4,1)
114 S1$=MID$(CD$,5,1)
115 S2$=MID$(CD$,6,1)
200 PRINT#1, CHR$(17);CHR$(0);CHR$(5);CHR$;H1$;H2$;M1$;M2$;S1$;S2$;CHR$(0);
300 ON KEY (1) GOSUB 1000' F1
310 KEY (1) ON
400 ON KEY (2) GOSUB 2000' F2
410 KEY (2) ON
500 ON KEY (3) GOSUB 3000' F3
510 KEY (3) ON
550 ON KEY (4) GOSUB 4000' F4
560 KEY (4) ON
570 ON KEY (10) GOSUB 9000' F10
580 KEY (10) ON
600 GOTO 300
1000 PRINT "F1  RESET"
1010 PRINT#1, CHR$(17);CHR$(0);CHR$(5);CHR$;H1$;H2$;M1$;M2$;S1$;S2$;CHR$(4);
1999 RETURN
2000 PRINT "F2  RESUME"
2010 PRINT#1, CHR$(17);CHR$(0);CHR$(5);CHR$;H1$;H2$;M1$;M2$;S1$;S2$;CHR$(8);
2999 RETURN
3000 PRINT "F3  STOP"
3010 PRINT#1, CHR$(17);CHR$(0);CHR$(5);CHR$;H1$;H2$;M1$;M2$;S1$;S2$;CHR$(140);
3999 RETURN
4000 PRINT "F4  GO TO 00:00:00 AND FLASH"
4010 PRINT#1, CHR$(17);CHR$(0);CHR$(5);CHR$;H1$;H2$;M1$;M2$;S1$;S2$;CHR$(130);
4999 RETURN
9000 CLS:PRINT "F10"  ENTER A NEW COUNT DOWN TIME"
9005 CLS
9010 GOTO 100
9999 GOTO 300
10000 END
```

**TECHNICAL SUPPORT**

For any questions concerning installation and operation of this product, contact our factory at:

**PHONE (800) 444-7161  
OR  
FAX (318) 797-4864**

**SERVICE POLICY**

It is recommended that all service for this product be done by the factory or by a factory authorized service representative. Applied Technical Systems will provide ongoing service support in and out of warranty. Send your repairs to:

**APPLIED TECHNICAL SYSTEMS  
849 KING PLACE  
SHREVEPORT, LA 71115**

**APPLIED TECHNICAL SYSTEMS  
WARRANTY POLICY**

ATS warrants its products to be free of defects in material and workmanship for a period of 24 months from the date of purchase. ATS will repair or replace any product returned to its authorized factory service center within the warranty period so long as there is no evidence that the product has been abused, misused, damaged by lightning, overloads of any kind or water, or altered in any way.

Products returned for warranty must be returned with freight prepaid. ATS will pay normal freight charges to return the product to the customer. Special premium freight requested by the customer will be charged to the customer.

ATS disclaims any warranties expressed or implied, including merchantability and/or fitness for a particular purpose. In no event shall ATS be held liable for incidental or consequential damages.