London Electronics Limited

S17XX
Series of Large Displays

Serial Data Input
5 digit & 7 digit
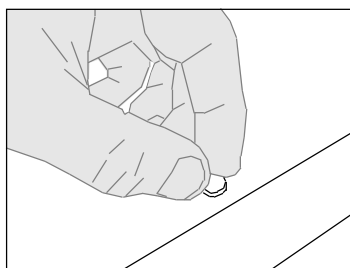
Rear case screws - please note

The rear panel is held in place with finger-screws, which only need to be gently tightened. **Do not use tools to tighten or loosen the screws, as this could cause damage to the internal threads.**

User's Manual

Notes

CONTENTS.

THE SERIAL INPUT MODEL - S17XX

INTRODUCTION

The S17XX is one member of a broad family of Large Displays.

This model is intended for large remote mimic display use. Various baud rates and protocols are incorporated and each display may be individually addressed. Data may be 8 bit no parity or 7 bit with parity (parity is ignored). Displays can also be configured by the user to select sectors of long data strings for display, and to discard unwanted segments.

The configuration settings of the display are stored in non-volatile E^2PROM memory, which is retained for at least 10 years. Change to the settings is achieved by way of remote contact closure inputs, allowing alteration of the unit's configuration menu.

Display type   Serial ASCII input display intended for large remote mimic
                                       display use. The unit responds to ASCII data derived from
                                       PLCs, PCs, weighing systems, suitable panel meters, etc.

Signal inputs   Selected by internal jumpers
                                       bipolar +/- 5V   (RS423)
                                       bipolar +/- 15V(RS232)
                                       differential 5V   (RS485)
                                       20mA loop, source or receiver powered

Data format   Serial ASCII at 300,1200,2400 or 9600 baud; 1 start bit, 8
                                       data (or 7 data plus parity) and 1 or more stop bits.

Handshake   No handshake, unit always ready for data

When you first switch on, the display will briefly show the address of the display and the baud rate it has been set for.....

$$A00\ 12$$

Address 00 to FF ————————⌐ ⌐————————— Baud Rate (03 = 300,
                                                   12 = 1200. 96 = 9600 etc.)

1.0 UNPACKING AND INSPECTION

PLEASE check the carton's contents as soon as possible after receipt, to detect any transit damage or losses.Unpack the contents and check each item in the box against the check list below to make sure you have all items.

Check List :

☐   Handbook

☐   Display

☐   Mounting kit (where appropriate)

☐   Programming Unit (If Ordered)

In the event of damage, please contact the carrier and advise our sales office of the fault.

Please retain the carton packing material, for future possible use.

2.0   GENERAL INFORMATION

This handbook covers the Serial Data input model of the 1700 series of large displays.

The 1700 series is a family of units for broadcasting process values and data on easy to read large 7 segment displays. Character heights of 2", 4", 6", 8" or 11" are standard, and, dependent on type, displays are 5 or 7 digit. Extra-large and Daylight viewing displays are available to special order.

The enclosures for the displays are of welded UPVC material with tough lenses, providing certified protection to IP65 for the internal electronics.

Case colours are white or black.

The units incorporate a 95 to 265VAC power supply (Which can be used on DC in the range 100 to 300 VDC) for operation off any mains source without the need to re-configure.

Display brightness is settable to 4 levels to accommodate differing ambient light conditions and the 3 standard character heights provide a choice of viewing distances of up to 20, 40 and 60 metres. Other character heights and brightnesses are available to special order.

The large displays are based around a common power and control card which is linked to display units of different sizes.

Instrument behaviour is set by way of remote contact closure pushbuttons, which provide access to and alteration of the instrument's menu, and the settings are stored in 10 year non-volatile memory.

Signal conditioning alterations, however, to select RS232, RS485, RS423 etc, require internal push-on jumper changes, so it is advisable to either specify input conditions at the time of ordering or check and adjust the jumpers prior to installing the unit.

2.1   GENERAL SPECIFICATIONS

Display type: Serial data input slave display

Signal Inputs   RS232, RS485, RS423, 20mA TTY, jumper selectable

Data Type   ASCII format, 8 data, no parity, 1 or more stop bits

Handshake   None required, always ready for data

Case material: UPVC case, neoprene gaskets, Stainless steel fasteners

Case colour :   White or Black

Case size:(mm WxH)

	5 digit	7 digit
2"	288x120	384x120
4"	480x168	672x168
6"	624x192	864x192

Case depth   :   90mm (115 mm including rear cable/glands)

Bezel depth   :   (including gasket) 15mm

Weight   :

	5 digit	7 digit
2"	2.5Kg	3Kg
4"	4.5Kg	5Kg
6"	5.0Kg	6Kg

Display type:

2".................................   High efficiency 57mm high 7 segment display tiles
4".................................   Ultrabright 102mm high 7 segment display tiles
6".................................   144mm high characters formed from twinned individual 5mm round
                                      red LEDs

Display Colour   Red as standard, Green and Amber as options

Daylight viewing versions, whether 2", 4" or 6" are made up of individual 5mm round lensed LED's

Power supply   :   95-264VAC, 100 to 300 VDC (12, 24, 48VDC options also available)
Power consumption :   20W typically, without thermostatic heater

3.0 CABLES

The units are supplied with approximately 2 metres of free ended cable for power, signal and serial ports. A junction box external to the display may be used to connect your own cabling to that of the display. You may, however remove unwanted cable altogether, if for example a particular signal port is not required.

REMEMBER The signals you will be feeding to the displays are quite small in comparison to some of the undesirable 'noise' generated by certain types of common electrical machinery. To obtain the highest degree of accuracy and reliability from your indication equipment, we strongly suggest that you....

DO NOT run signal cables adjacent to power/switching lines or near equipment liable to generate large amounts of electrical noise, such as contactors, solenoids, fluorescent tubes, discharge lamps, motor control equipment, etc.

Do use screened, twisted-pair cable to minimise the amount of noise being fed into the display.
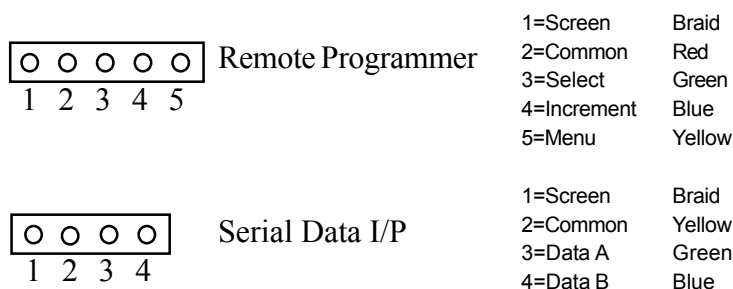
WARNING: RISK OF LETHAL ELECTRICAL SHOCK

YOU MAY NEED TO OPEN THE CASE TO ALTER JUMPER POSITIONS OR TO PANEL MOUNT THE DISPLAY. BEFORE COMMENCING TO OPEN THE CASE YOU **MUST ENSURE** THAT POWER HAS BEEN **DISCONNECTED**, AND MUST ENSURE THAT POWER CAN IN NO CIRCUMSTANCES BE RE-APPLIED TO THE DEVICE WHILST THE CASE IS OPEN.
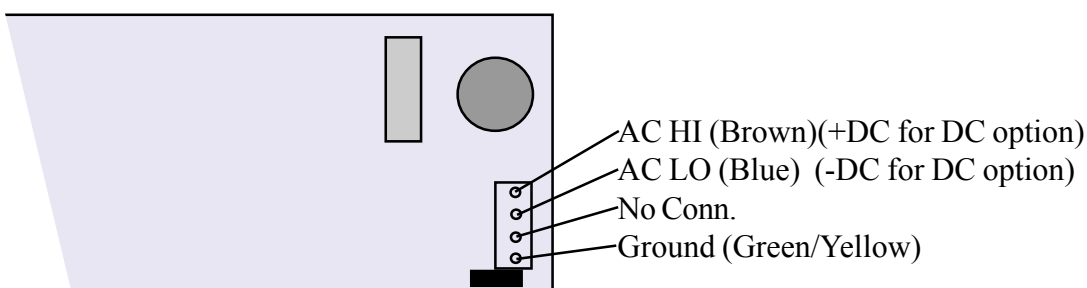
3.1 SIGNAL CABLES

The signal and data connectors are at the left hand end of the power and control card. They are connected to extension cables, which are accessible from the rear of the display. Use a junction box to extend these cables, or substitute your own cabling, which must be shielded.

Remote Programmer
1 2 3 4 5

1=Screen	Braid
2=Common	Red
3=Select	Green
4=Increment	Blue
5=Menu	Yellow

Serial Data I/P
1 2 3 4

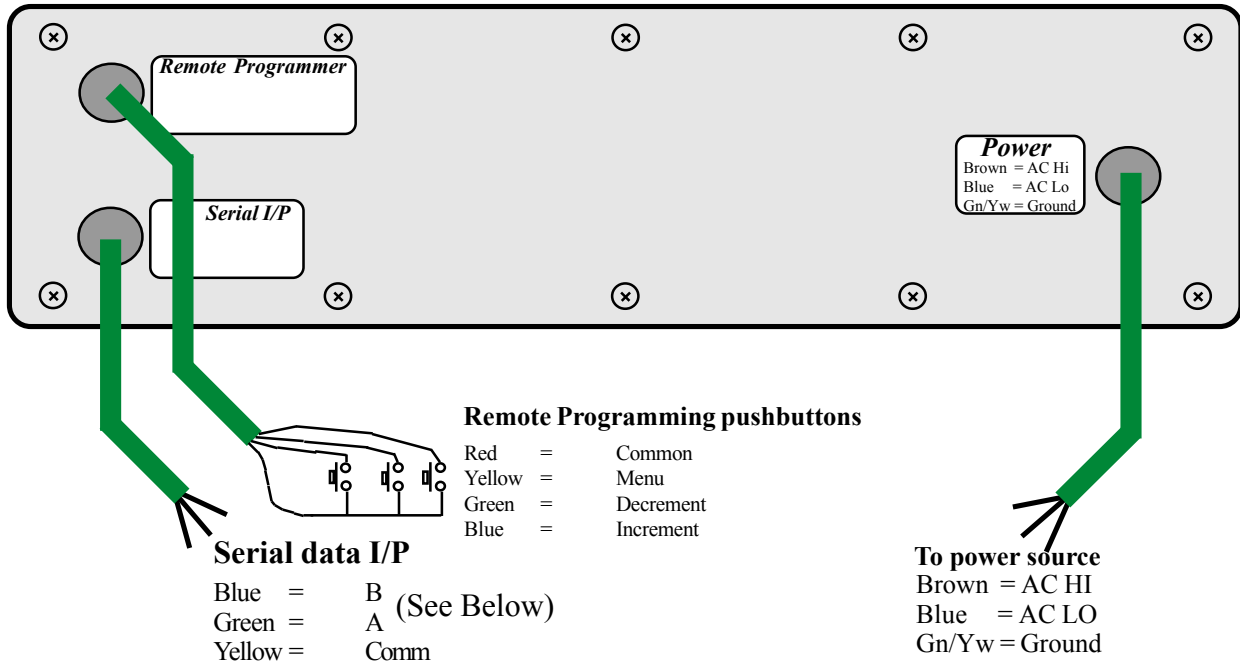| 1=Screen | Braid |
2=Common	Yellow
3=Data A	Green
4=Data B	Blue

3.2 POWER CABLE

The unit incorporates a switching power supply to enable the unit to operate over the full 95 to 265 Volts range.   The **power lead** must be of 3 core construction, with the ground wire **bonded to a good ground**.

AC HI (Brown)(+DC for DC option)
AC LO (Blue) (-DC for DC option)
No Conn.
Ground (Green/Yellow)

4.1 **RECOGNISED CODES**

Control Codes

ASCII Code	Keyboard Character	Action
02	Ctrl B	STX: active only after ETX, XOFF or EOT. Starts the display listening to data. Following ETX or XOFF, ***IF ADDRESSING IS ENABLED*** , the next two characters must be the same as the configured address, or the wildcard address 00. If the unit is configured with the wildcard address 00, the 2 characters following STX are ignored.
03	Ctrl C	ETX: stops the display from listening to data, except ESCAPE, STX or XON. If so configured, adds a CR to data string
06	Ctrl F	ACK: flash command, causes the last displayable character entered to flash. Must be added to each character to be flashed.
0C	Ctrl L	FF: Blanks the display
0D	Ctrl M	CR: data terminator. In strobed mode, transfers the data string into the display and clears the input buffer.
11	Ctrl Q	DC1/XON: Same action as STX
12	Ctrl R	DC2: sets display to 25% brightness
13	Ctrl S	DC3/XOFF: Same action as ETX, but does not add Carriage Return to datastring
14	Ctrl T	DC4: sets display to 100% brightness
18	Ctrl X	CAN: Sets display to 50% brightness
1B	ESCape	Sending ESC twice, returns display to its original power-on conditions

Remote Programming pushbuttons

Red = Common
Yellow = Menu
Green = Decrement
Blue = Increment

Serial data I/P

Blue = B
Green = A (See Below)
Yellow = Comm

To power source

Brown = AC HI
Blue = AC LO
Gn/Yw = Ground

Power
Brown = AC Hi
Blue = AC Lo
Gn/Yw = Ground

Remote Programmer
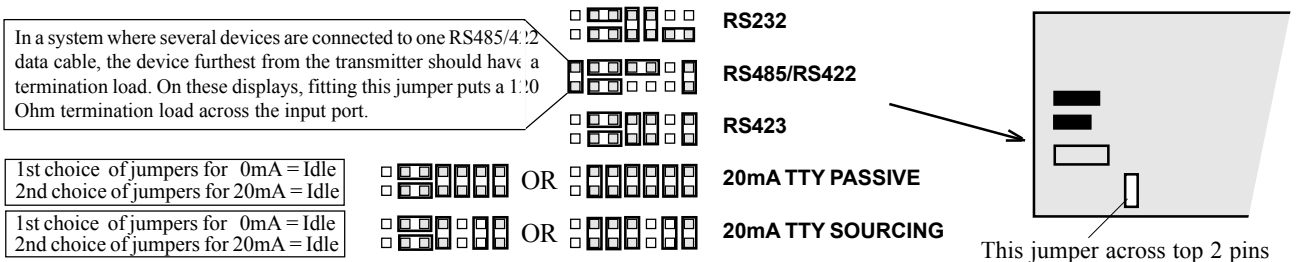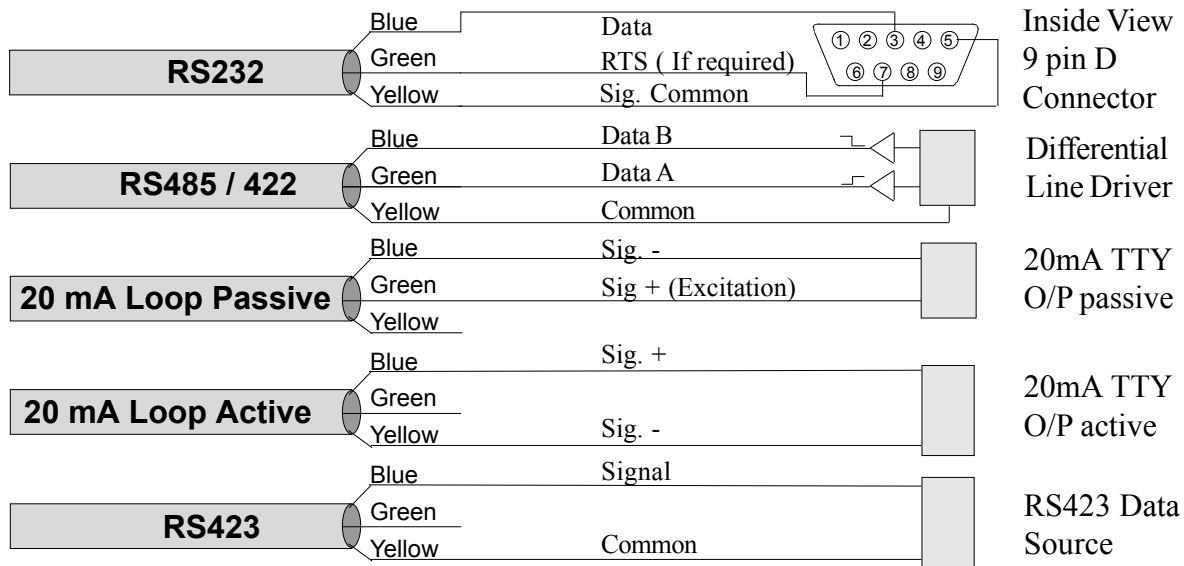
Serial I/P

4.2   RS232, RS485, RS422 , RS423 & 20mA TTY INPUT SELECTION

If, when ordering your display you specified the input type required, this will have been set for you prior to despatch, and should be noted on the label on the rear of the display. If you **did not specify** the input type, this will be the *factory default of RS232 at 1200 baud, strobed.*

You can change the input configuration yourself, if you wish to do so, by repositioning the jumpers within the unit. Remove all screws on the rear case, loosen the cable glands and ease the case halves apart.
ENSURE POWER HAS BEEN SWITCHED OFF BEFORE OPENING THE CASE !

RS232
Blue — Data
Green — RTS (If required)
Yellow — Sig. Common

Inside View
9 pin D
Connector

RS485 / 422
Blue — Data B
Green — Data A
Yellow — Common

Differential
Line Driver

20 mA Loop Passive
Blue — Sig. -
Green — Sig + (Excitation)
Yellow

20mA TTY
O/P passive

20 mA Loop Active
Blue — Sig. +
Green
Yellow — Sig. -

20mA TTY
O/P active

RS423
Blue — Signal
Green
Yellow — Common

RS423 Data
Source

In a system where several devices are connected to one RS485/422 data cable, the device furthest from the transmitter should have a termination load. On these displays, fitting this jumper puts a 120 Ohm termination load across the input port.

RS232

RS485/RS422

RS423

1st choice of jumpers for 0mA = Idle
2nd choice of jumpers for 20mA = Idle

OR   **20mA TTY PASSIVE**

1st choice of jumpers for 0mA = Idle
2nd choice of jumpers for 20mA = Idle

OR   **20mA TTY SOURCING**

This jumper across top 2 pins

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4.3 DATA AND CONTACT CLOSURE CONNECTIONS

RS232 Data input:

If using a P C to generate the RS232 input signal, the connections shown below will be suitable for IBM compatible machines.

	9 pin D connector Pin #	25 pin D connector Pin #	supplied wire colour
Serial i/p A	3	2	Blue
Serial i/p B	7	n/c	Green
Common	5	7	Yellow

If using a 25 pin D connector you may need to link pins 5,6,8 and 20 on the connector in order to obtain a continuous output string.

Most PC's with Windows™ will have an accessory called 'TERMINAL' , which is easy to configure to provide RS232 output, useful in testing your display. Typical settings are as follows....

Go to SETTINGS window when in terminal, and set TERMINAL EMULATION to 'TTY Generic' Set COMMUNICATIONS so that Baud rate = 1200 or preferred rate which display is already set to, Data bits = 8, Stop bits = 1, Parity = none, Flow control = None. Select the connector which is free, and connect your display to this connector.

RS485 Data Input

Connect your RS485 source to wires A and B (Blue and Green) and connect Common (Yellow) to Common of the source. If your display is addressed, and is one of many being fed from a single source, it is preferred practise to terminate the final receiver with a resistive load. If your display is the final device in a string of receivers, a terminating resistor is available , see jumper positions for Input Selection on previous page.

RS423 Data Input

The RS423 signal is taken to cable A (Blue wire) and Common (Yellow wire) . The Green wire requires no connection.

20mA TTY Data Input

If the display is to be passive, connect input to A (Blue wire) and Common (Yellow wire) to common. No connection to B (Green). If the display is required to excite the loop, connect B (Green wire) to input and A (Blue wire) to common of the input source.No connection to Comm (Yellow wire).

Contact closure programming input:

Function	Supplied wire colour
Decrement	*Green*
Increment	*Blue*
Menu	*Yellow*
Common	*Red*

4.4   **PROGRAMMING YOUR DISPLAY & SETTING BRIGHTNESS**

The S17XX offers useful flexibility in selection of input type, baud rate, brightness, addressing etc., and all parameters are adjusted by using the three contact closure programming pushbuttons.

It is worth spending a little time familiarising yourself with the menu and the programming technique before carrying out a full programming routine. The menu structure is described below, and is followed by a flow diagram to add clarity.

If you make up your own programmer, please be sure to use good quality pushswitches. Avoid simply tapping the bare ends of the programmer cable together in place of fitting switches, you will find it difficult to make clean, determined contact, with the result that you will probably accidently skip past sections of menu.
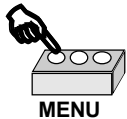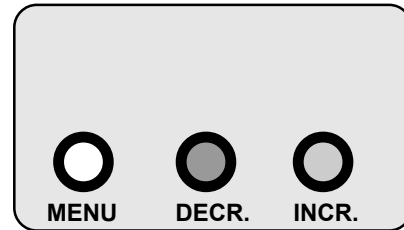
MENU Allows you to enter the programming menu, and steps down all the variable options

DECREMENT Allows you to move down a stack of choices within a menu section, or reduce the value of a selected digit by 1 each time the button is pressed.

INCREMENT Allows you to move up a stack of choices within a menu section, or increase the value of a selected digit by 1 each time the button is pressed
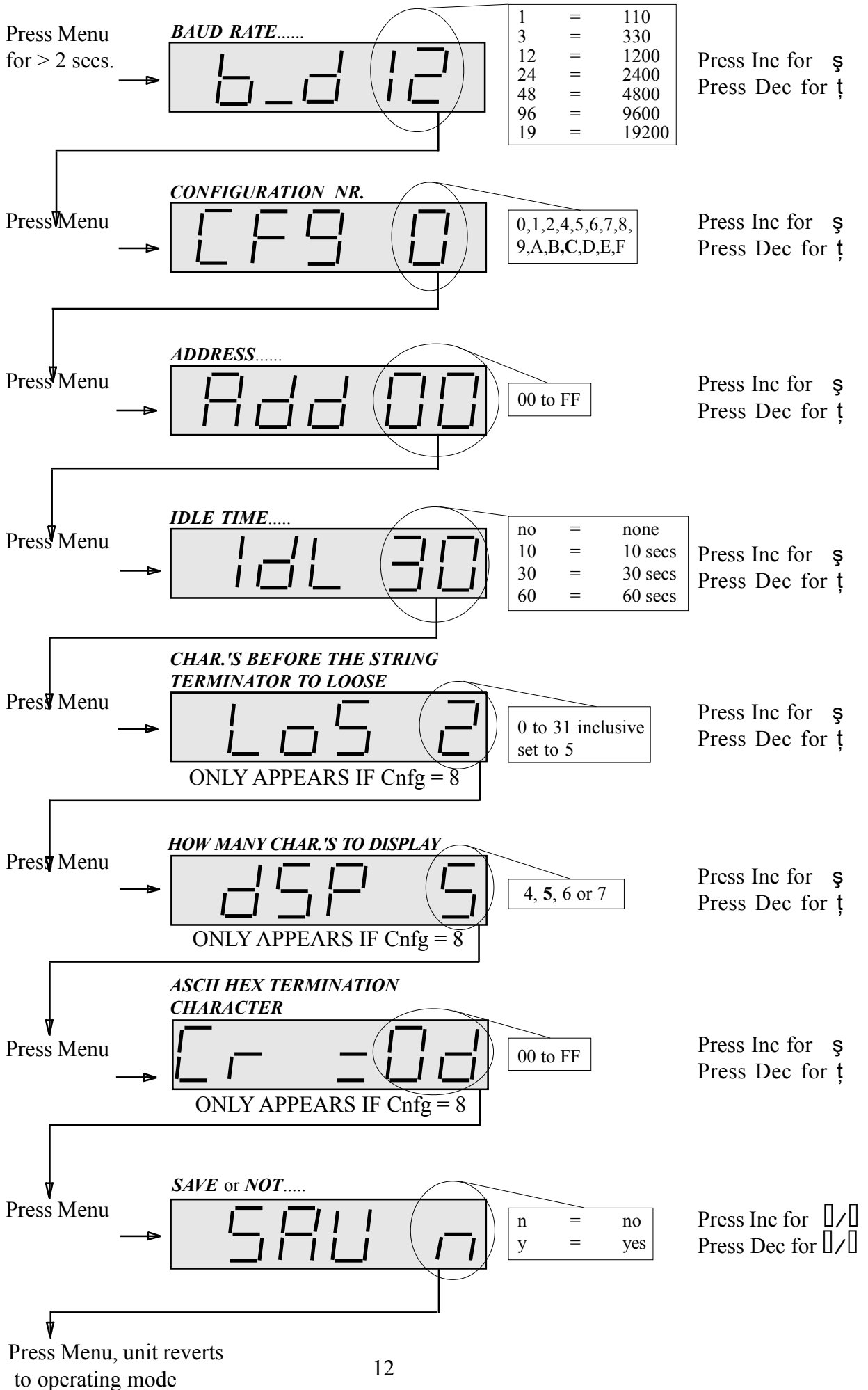
BRIGHTNESS ADJUSTMENT
When in normal running mode, you may set the display's brightness to one of 4 levels by pressing the 'DECREMENT' button. To save the chosen level, go into the menu and at the prompt 'SAV' select 'Y'. then press the menu button again.

Before commencing to programme your display, note below what you require the display to do and that you have set all jumpers correctly:-

Signal Type? _____   EG RS232, 485 etc. Set Jumpers to suit

Baud Rate? _____   EG 1200, 9600 etc. to suit your data source

Address, if multi-drop? _____   Set to 00 if no addressing needed

Data watchdog needed? _____   Set Idle to no, 10, 30 or 60 seconds

String-Stripping needed? _____   If yes, set Cnfg to 8

4.5   **Menu Flow Diagram**

Press Menu
for > 2 secs. →

BAUD RATE......

`b_d 12`

1	=	110
3	=	330
12	=	1200
24	=	2400
48	=	4800
96	=	9600
19	=	19200

Press Inc for ş
Press Dec for ţ

Press Menu →

CONFIGURATION NR.

`CF9 0`

0,1,2,4,5,6,7,8,
9,A,B,**C**,D,E,F

Press Inc for ş
Press Dec for ţ

Press Menu →

ADDRESS......

`Add 00`

00 to FF

Press Inc for ş
Press Dec for ţ

Press Menu →

IDLE TIME.....

`IdL 30`

no	=	none
10	=	10 secs
30	=	30 secs
60	=	60 secs

Press Inc for ş
Press Dec for ţ

Press Menu →

*CHAR.'S BEFORE THE STRING
TERMINATOR TO LOOSE*

`LoS 2`

ONLY APPEARS IF Cnfg = 8

0 to 31 inclusive
set to 5

Press Inc for ş
Press Dec for ţ

Press Menu →

HOW MANY CHAR.'S TO DISPLAY

`dSP 5`

ONLY APPEARS IF Cnfg = 8

4, **5**, 6 or 7

Press Inc for ş
Press Dec for ţ

Press Menu →

*ASCII HEX TERMINATION
CHARACTER*

`Cr =0d`

ONLY APPEARS IF Cnfg = 8

00 to FF

Press Inc for ş
Press Dec for ţ

Press Menu →

SAVE or *NOT.....*

`SAU n`

| n | = | no |
| y | = | yes |

Press Inc for Y∕N
Press Dec for N∕Y

Press Menu, unit reverts
to operating mode

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4.6 Menu Descriptions

To enter the programming menu, press MENU for approximately 2 seconds. Some of the parameters are described below....

1) B_D . Use the INC or DEC keys to select your desired **BAUD** rate

2) CFG. This is the **CONFIGURATION** number , and determines the response of the indicator to incoming data.

0 = Test Mode. All displayable characters are shown as they arrive, scrolling from right to left

1 = Normal mode. Incoming data is stored in the buffer and presented to the display on receipt of a carriage return (0D hex). The decimal point character 2E hex does not occupy the buffer but is added to the previously received character ... so a valid character must be received before a decimal point can be shown. Some control character responses in this mode are:

a) <ETX> or <DC3> will stop the unit responding to further data except for a pair of <ESC> characters or <STX> or <DC1>
b) <FF> form feed will blank the display and clear the buffer
c) <DC2> will reduce the brightness to 25%
d) <CAN> will reduce brightness to 50%
e) <DC4> will set brightness to 100%

2 = Normal mode, with addressing. String must be <ETX or DC3> <STX or DC1>, <address><data> <ETX or DC3>. Data will be displayed.

4 = STX / ETX termination. Displayable characters following <STX> are stored in a buffer and transferred to the display on receipt of <ETX> No addressing is available.

6 = As config. 4 but with addressing enabled. The first 2 characters after STX must match the unit's address.

8 = String Extraction mode. This mode allows you to display a particular part of a string. A termination character is chosen to work back from, and you set the number of characters to discard (lose), and the number of characters to display.

3) ADD   This is the **ADDRESS** from 00 to FF. If a unit is set to 00, it will respond to all addresses. If address 00 is sent in a string, all units will repond regardless of their address.

4) IDL   This sets the amount of time the unit will wait **IDLE** , if data is not present or is lost, before displaying a prompt 'Data ?' Can be set to 'no' if no idle detection is required.

5) LOS   If mode 8 (String Stripping mode) has been selected, this determines the number of characters, to **LOOSE** or discard, prior to the string terminator .

6) DSP   If mode 8 (String Stripping mode) has been selected, this determines the number of characters you wish to **DISPLAY** , received prior to the LOSE characters.

7) Cr = If mode 8 (String Stripping mode) has been selected, this sets the ASCII Hex termination (CARRIAGE RETURN) character you wish the display to use, normally set to 0d (<CR>)

8) SAV You may elect to permanently SAVE your settings within the meter , or simply use them for this session, to be lost when power is removed, revert to previous saved settings when power re-instated. Select 'Y' for permanent storage, 'n' for temporary session storage.

4.7   Addressing Notes (Cnfg = 2,6,or 8)

Addressing is initialised with the ETX or XOFF character, which stops the unit responding to data. Following an STX or XON character, the next two characters are treated as address characters. If these characters are 0 0 (the broadcast address) or are the same as the units configured address, the subsequent characters are responded to by the unit.
A unit configured with the broadcast address 00 ignores the address characters, and responds to the third character onwards, until ETX or XOFF is received. The unit may be configured to treat ETX as a string terminator, so a carriage return terminator is not required.

NOTE The displays may be configured with up to 255 different addresses, using a 2 digit hex number. However, when sending the address characters on a serial string, you should not simply send 1A as ASCII address. Any alpha character in the address string should be represented by ASCII hex 3A to 3F as follows....

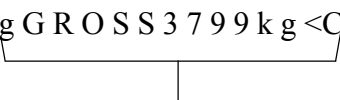Hex Address bit   Required ASCII character
A   : (Colon)
B   ; (Semi-colon)
C   < (Less than)
D   = (Equal to)
E   > (Greater than)
F   ? (Question mark)

4.8   String Extraction Notes (not normally invoked on this model display)

The string extraction facility is very often required in weighing and similar applications, where the actual data to be displays lies within a compound string.

As an example, let us assume that you wish to display the Nett value (2550) of weight in the following string, where 09786 is an example of a serial number, status number, or similar...

   0 9 7 8 6 N E T T 2 5 5 0 k g G R O S S 3 7 9 9 k g <CR>

These are the char.'s we want to lose

Between the terminator <CR> and 2550 there are 13 characters to discard, so set 'LOSE' to 13

You only wish to display 4 digits, so set 'DISP' to 4

The terminating character is <CR> so set 'Cr' to 0d

The display should show 2550 and no other characters.

5.0   INSTALLATION

If possible position the display away from heat and direct sunlight on the display face. The displays should not be exposed to substances liable to damage uPVC, acrylic or glass.

If mounted outside, the display should be protected by a shroud to limit direct falls of rain, the cooling effect of which can give rise to the display sucking in moisture.

REMEMBER The signals you will be feeding to the displays are quite small in comparison to some of the undesirable 'noise' generated by certain types of common electrical equipment. To obtain the highest degree of accuracy and reliability from your indication equipment, we strongly suggest that you....

DO NOT run signal cables adjacent to power/switching lines or near equipment liable to generate large amounts of electrical noise, such as contactors, solenoids, fluorescent tubes, discharge lamps, motor control equipment, etc.

DO use shielded, twisted-pair signal cable to minimise the amount of noise being fed into the display.

5.1　　　　MOUNTING POSITIONS

Case sizes are subject to change, so we recommend you refer to our datasheet at
http://www.london-electronics.com/pdf/1700.pdf for latest details
General specifications for the 1700 series

For the standard-stock single line displays:

Case Material : uPVC, welded.　Gasket Material: Neoprene　　Sealing screws: Stainless Steel

Digit Height	Case dimensions* Depth = 75mm + cables		Panel Cutout dimensions		
	5 digit　mm (Kg)	7 digit mm (Kg)	5 digit mm	7 digit mm	Sealing
57mm	291x142 (2.5)	387x142　(3.0)	293x144	389x144	IP65
102mm	483x179 (4.5)	674x179　(5.0)	485x181	676x179	IP65
144mm	642x181 (5.5)	883x181　(6.0)	644x183	883x183	IP65
200mm	824x237 (7.0)	1140x237　(8.0)	826x239	1142x239	IP65
280mm	1169x327(12.0)	1606x327(13.5)	1171x329	1608x329	IP65
400mm	1515x456(16.0)	2135x456(18.0)	1517x458	2137x458	IP65

* Panel mounting bezel (if requested) adds 18mm to width and height
Mounting methods　　　: Wall, panel or suspension, mounting kit included in price, specify when ordering. Cowl extra.
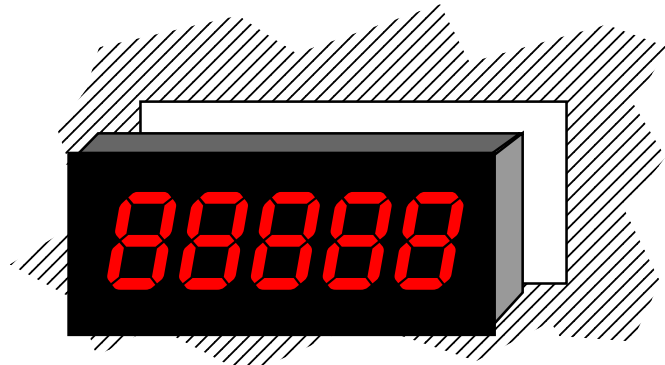Operating temperature : -10 to +50 degrees C
Storage temperature　　: -40 to +60 degrees C
Humidity　　　　　　　: 57-144mm types 100% (IP65), 200-400mm types 0-95% non-condensing (IP54)
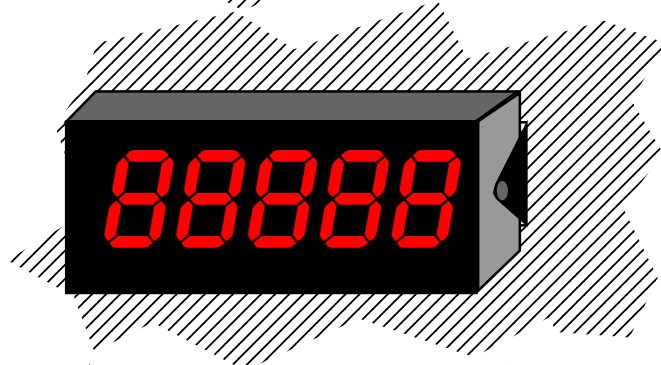
5.2　　　　PANEL MOUNTING

Seals IP65 from the front, IP54 from behind.
Mounts into a panel cutout.

5.3　　　　WALL MOUNTING

A pair of swivel brackets, complete with fixing
screws to the case, but excluding fixing screws
to the wall.

5.4　　　　SUSPENSION MOUNTING

A pair of swivel brackets, complete with fixing
screws to the case, but excluding fixing screws
to the support.

6.0 TROUBLE SHOOTING AND MAINTENANCE

The Large displays have been designed to provide a long trouble-free life.

The front lens may be cleaned with a proprietary window cleaner, and the case may be hosed down, and cleaned with a cloth dampened with mild detergent. Surface scratching can be polished out with a mildly abrasive cleaner such as perspex cleaner.

The mains power supply is for 110 or 240 volts mains, so there is no risk of applying 240 volts to a 110 volt unit. Filtering is incorporated on the mains input, to prevent damage due to short spikes on the mains.

Damage will occur if the unit is subjected to more than 265 volt power application.
There are transient absorbers on the serial ASCII data input and output, to absorb spikes on data lines. Spikes on the data input may result in the unit 'hanging up', as the spikes could be interpreted as data. Under these circumstances, the unit should be powered down and up again after a few seconds.

Check wiring prior to powering the units!

To maintain the NEMA-4 ingress protection, it is advisable to inspect the gasket set whenever the display is removed and refitted in a panel, and, if damaged or deformed, to obtain a replacement from your supplier. Please quote the full model number to ensure the correct size is obtained.

Technical helpline +44-01767 626444 Please make a note of full model number, serial number and configuration number before calling us. ***Please also read the manual before calling*** and, if you find any part unclear, or do not find the information you need, let us know. This way we can improve future editions of the manual for you.

7.0 SAFETY CONSIDERATIONS

The 1700 series are protected in accordance with IEC Safety Class 1. The instruments are designed and tested in accordance with IEC publication 348, 'Safety Requirements for Electronic measuring apparatus', and are supplied in a safe condition.

☠

Whenever protection is likely to have been impaired by damage, the equipment shall be made inoperative and be secured against any intended operation.

Removal of the rear cover WILL EXPOSE LIVE PARTS. The equipment must be disconnected from the supply before carrying out any adjustments, replacement, or repair with the case opened. If any work is carried out with the equipment opened and powered, it shall only be carried out by a skilled person who is aware of the hazard involved.

Power connections: The unit is operable as soon as the mains is applied, there is no power switch.

☠

The equipment must be connected to a protective ground. Any interruption of the ground conductor inside or outside the equipment is likely to make the equipment dangerous.

The power and signal leads should not be allowed to collect within the instrument; all excess lead must be pulled out through the cable glands.

Note that capacitors inside the instrument may still be charged when the equipment has been disconnected from the supply. Before carrying out any work inside the equipment, a period of one minute should be allowed for capacitors to discharge; to discharge the mains filter capacitors, short together the earth, AC HI & AC LO wires.

R F I
The equipment generates and uses radio frequency energy, but when properly installed as described, complies with EN55022. The equipment is certified as meeting EN50081-1 and EN50082-1

Shielded cables **MUST** be used for all signal and data leads, and use of a 3 core power lead is required. All lead shielding braids should be bonded to a good ground.

8.0 **Warranty**

London warrants its products against defects in materials or workmanship for a period of two years from the date of purchase.

In the event of a defect during the warranty period, the unit should be returned, freight(and all duties and taxes) prepaid by the Buyer to the authorised London distributor from where the unit was purchased. The Distributor, at its option, will repair or replace the defective unit. The unit will be returned to the Buyer with freight charges prepaid by the distributor.

LIMITATION OF WARRANTY
The foregoing warranty shall not apply to defects resulting from:

1. Improper or inadequate maintenance by the buyer.
2. Unauthorised modification or misuse.
3. Operation outside the environmental specification of the product.
4. Mishandling or abuse.

The warranty set forth above is exclusive and no other warranty, whether written or oral is expressed or implied. London specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

EXCLUSIVE REMEDIES
The remedies provided herein are the buyer's sole and exclusive remedies. In no event shall London be liable for direct, indirect, incidental or consequential damages (including loss of profits) whether based on contract, tort or any other legal theory.

Notes

Declaration of Conformity

Declaration Number   : EMC1700 Iss. 5
Issue Date   : 14 July 1999
Products Covered   : 1700 Series Large Displays
Title   : Large Process, Load, Serial
    Rate & Totalising Displays

This is to confirm that the Products covered by this declaration have been designed and manufactured to meet the following specifications :

EN55022:1987 Conducted Emissions: Class B
EN55022:1987 Radiated Emissions : Class B
IEC801-2:1984 Electro-Static Discharge Immunity: 8kV Air
IEC801-3:1984 Radiated ElectroMagnetic field Immunity: 3V/m
IEC801-4:1988 Fast Transient Immunity : AC 1kV, cable 0.5kV

Thus the products conform with the applicable sections of the following standards:

EN50081-1:1992 (normative)
EN50082-1:1992 (normative)

and comply with the requirements of Council Directive 89/336/EEC relating to Electro-Magnetic Compatibility & are designed to meet EN61010 safety directive..

To confirm compliance, representative models within the range have been independently tested and certified by MARCONI INSTRUMENTS EMC Department.

MARCONI CERTIFICATE #   : TC96/029C
MARCONI CERTIFICATE Issue # : 1
MARCONI Certificate Issue Date   : 14 February 1996

Conditions

The meters are permitted a worst case error of 1% of A/D range during electro-magnetic disturbance, and must recover automatically when disturbance ceases without the need for human intervention, such as resetting, power-down etc.

The meters covered by this certificate must be installed in adherence to the following conditions :-

Signal cabling shall be routed separately to power carrying cabling (includes relay output wiring)
All signal cabling shall be screened. The screen shall only be terminated to the power earth terminal

This certificate applies only to meters carrying Serial Numbers 701001 or higher.

Signed as true and correct, for and on behalf of London Electronics Ltd.

J.R. Lees
Director