MERG Model Electronic Railway Group

Remote Data Display (RDD)
Operator Instructions and Cable Details

Switches

1. **'Ack'**   This is the only control present on Display Stations, and must be pressed by the Operator whenever a new number is received. This is indicated by the flashing of the decimal points on the display, and the sounding of a Buzzer in sympathy with the flash. All other switches listed below are on the Control Station only.
2. **'Reset'**   This is used to initialise the system, and can be used at any time to revert to a known condition. Upon operation, the Control Station polls the Display Stations to determine which are connected. The Display Station Operators must acknowledge the reset operation by pressing their 'Acknowledge' buttons.
3. **'Inc/Dec'**   This is used to change the number to be broadcast to the displays. It is a centre-off biased switch, and each operation will cause the Control Station display to either increment by one (toggle switch up) or decrement by one (toggle switch down). The switch may be operated any number of times until the desired number is reached. A setting of zero causes the whole display to be blank. Decrementing below zero will give '9999' and so on. The number is not yet broadcast to the Display Stations.
4. **'Send'**   The operation of this switch causes the Control Station to broadcast the number set previously by the 'Inc/Dec' switch to all Display Stations. If Polling has been selected (see below), the Acknowledge LED for each attached Display Station will be lit, until each Display Station Operator presses their Acknowledge button. As this occurs, the relevant LEDs will extinguish. During this time, the Inc/Dec switch is disabled, to prevent a new number being selected until all Acknowledges have been received. This switch is also used to enter the optional 'Number Preset' operation after power-up.
5. **'Poll'**   If the Poll/Acknowledge facility is not required this switch should be left in the 'up' condition i.e. not Poll. This will prevent the Control Station from polling the Display Stations after a new number is broadcast. It can also be used to escape from any situation where a Display Station operator does not respond with an Acknowledge. This is achieved by briefly setting the switch to the 'up' position. This mode will also cause Display Station Buzzer/Flashing rates to increase every time a new number is ignored by their operators.

Powering up

1. Connect the Mains Power Adaptor to the 2.1mm Power Socket on the Control Station. The power supply voltage is recommended to be between 6V to 9V DC, positive on the centre pin, capable of supplying approximately 250mA per station.
2. Connect each Display Station to the central Control Station using the Data/Power cables, detailed overleaf. Display Stations are provided with two 5 pin DIN plugs to allow the user to construct each cable to suit their system.
3. Switch on the Mains Power Adaptor.
4. Within a few seconds, the Control Station and Display Stations will each go through a power-up self-test sequence. This sequence is used to exercise all the LED display segments, and in the case of the Display Stations, their Buzzers as well. Additionally, the Display Stations use this sequence to read and briefly display their own address, set on internal DIL switch S1. Each Display Station must have their S1 set to a different number. The Control Station also takes this opportunity to poll all possible Display Stations, which may be connected. The Control Station sequence deliberately takes slightly longer to finish than the Display Station sequence, to ensure the Display Stations have read their own addresses by the time the Control Station polls them. At the end of the power-up sequence, the Control Station will display all known responding Display Stations on its Acknowledge LEDs.

Initialisation

There are two methods of initialising the system for use, **'Standard'** or **'Number Preset'**.

'Standard' clears the display, polls the Display Stations, and starts the count from zero:
1. Toggle the 'Reset' switch.
2. Wait for each Display Station Acknowledge to arrive.

'Number Preset' allows the system to start from any number, allowing an unfinished sequence to be continued at a later date:
1. Hold down the 'Send' switch, toggle the 'Reset' switch, then release both. This enters 'Number Preset' mode.
2. The right hand digit (units) will light, and can then be set to the desired value with the 'Inc/Dec' switch.
3. When the desired value is reached, toggle the 'Send' switch.
4. The next digit (tens) will light and can then be set to the desired value with the 'Inc/Dec' switch.

5. When the desired value is reached, toggle the 'Send' switch.
6. The next digit (hundreds) will light and can then be set to the desired value with the 'Inc/Dec' switch.
7. When the desired value is reached, toggle the 'Send' switch.
8. The next digit (thousands) will light and can then be set to the desired value with the 'Inc/Dec' switch.
9. When the desired value is reached, toggle the 'Send' switch.
10. This process can be repeated if any errors are made. The action of toggling the 'Send' switch moves the 'active' digit one position left, or wraps round to the beginning again after the fourth.
11. To exit the 'Number Preset' mode, toggle the 'Reset' switch. The system will then commence from the number entered. It is not necessary to enter all four digits, the process can be exited whenever convenient, e.g after entering '37' if that is the number required.

Operation

1. Select the Poll/No Poll option.
2. Use the Inc/Dec switch to select the required number.
3. Toggle the 'Send' Switch.
4. If Polling is selected, wait for all Acknowledge LEDs to extinguish before repeating 2, 3 above.

Buzzer Operation (Display Stations only)

1. The Display Station Buzzer operates in similar fashion to the flashing Decimal Points, i.e. when a new number arrives, the Buzzer will bleep at the same rate as the flashing.
2. The Buzzer/Flashing can be stopped by pressing the 'Ack' switch to acknowledge the receipt of the new number.
3. If the Control Station operator decides not to use the 'Polling' option, they can continue to enter new numbers whether Acknowledges are received from the Display Stations or not.
4. In this case, if the Display Station operator(s) fail to press their button before a new number is sent, their Buzzer/Flashing rate will increase to indicate they are falling behind.
5. The rate can increase up to three times before reaching its limit of operation. Thereafter, the rate will stay at its fastest until the button is pressed. Clearly, the numbers displayed by then will be meaningless and operator discussion will be needed to sort out the true situation.
6. Pressing the 'Ack' button at any time in this sequence will reset the Buzzer/Flash rate to its normal value.

Cable Construction

The Power Input cable for the Control Station should use positive inner, negative outer connections, with a 2.1mm Power Connector. If desired, a different size could be used by replacing SK1 with a socket of the desired size, with equivalent mounting hole dimensions.

The cables between all stations consist of a 2-pair Twisted pair cable, one pair carrying power (+V and 0V) and the other pair carrying the RS485 differential data signal (A and B). A foil screen and drain wire are normally included with this type of cable, and the drain wire can optionally be connected to the DIN plug metal bodies. However, this will have little effect on performance.

It make no difference which pair within the cable is used for either job, so long as they are used as a pair for the task. Stripping back the cable end will show how the pairs are grouped.

The DIN plugs should be wired pin-to-pin, i.e. Pin 1 at one end to Pin 1 at the other, grouped as a pair with Pin 3 doing the same. Pin 4 and Pin 5 form the other pair. Pin 2 is not used. This pinning arrangement is identical to that used by Lenz X-Bus.

Cable Construction

Plug pins shown from wiring side
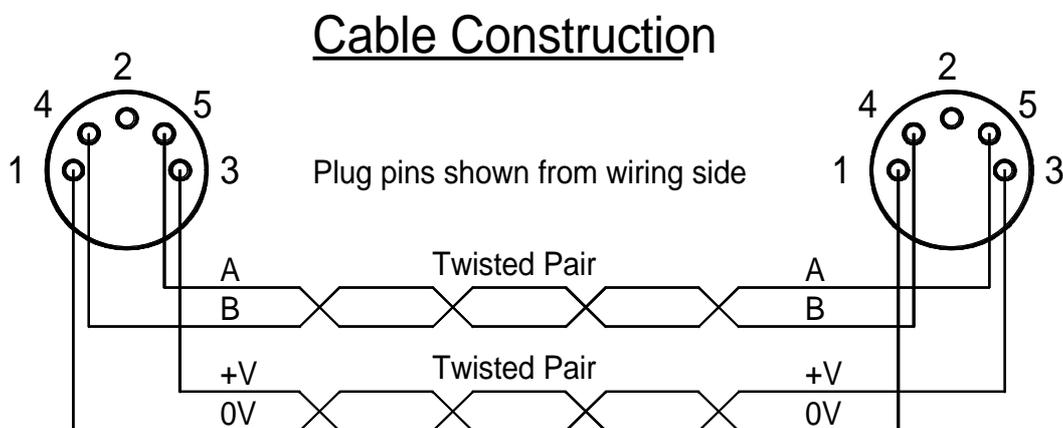
Connect cable screen (or drain) wire to Plug body shells if desired