

# Fast Clock Display

## For NCE DCC Systems

This device displays the fast clock maintained by an NCE DCC Command Station.

The display of the fast clock value will be in either a 12-hour or 24-hour format, depending on how it is configured on the NCE Command Station. When using 12-hour format, PM times are indicated by the colon flashing at 1 Hz.

### Electrical Specifications

Cab bus connections	Three RJ-12 jacks: Two on rear for cab bus through connection. One on front for cab connection.
Primary power supply	Powered by cab bus
Optional power supply	May be powered by a 12 VDC supply - optional supply also powers down-stream cab bus.
Current draw	Under 20 milliamperes

### Connecting the Fast Clock Display

Connecting our Fast Clock Display is very similar to connecting NCE's Cab Bus Fascia Panel, model UTP.

A cab bus cable with an RJ-12 plug (six position, six conductor) on the end is plugged into the jack on the rear of the Fast Clock Display labeled **Upstream**. When viewed from the back of the Fast Clock Display, this is the jack on the right as seen in Figure 1.

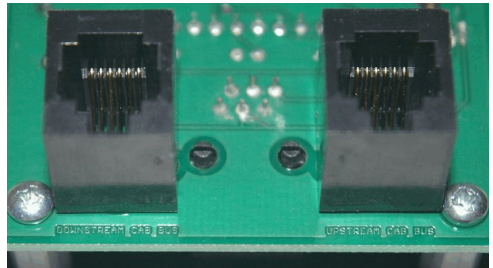


Figure 1

Your cab bus can be daisy chained from one Fast Clock Display to another, or to a UTP. Make sure that the cable coming from the command station is plugged into the **Upstream** jack and the cable continuing away from the command station is plugged into the **Downstream** jack. This difference is critical when an optional power supply is used, as it will power the Fast Clock Display, a cab plugged into the front jack, and the downstream bus.

The RJ-12 jack on the front panel may be used to connect a cab.

### Installing on Layout Fascia

The Fast Clock Display may be mounted on your layout's fascia, or on some other flat panel. A square hole must be cut slightly larger than the circuit board, which is 2.3" square. Four 1/8" mounting holes are provided in each corner of the face plate in order to use either #4 screws or 1/8" rivets to hold the Fast Clock Display in place.

# Proper Bus Cabling

If you are experienced with NCE command control systems, you will be familiar with this, but it is worth repeating here.

Bus cables between the command station and each device (either the Fast Clock Display, a UTP, or a Wireless Base Station, RB02) must be wired straight through.

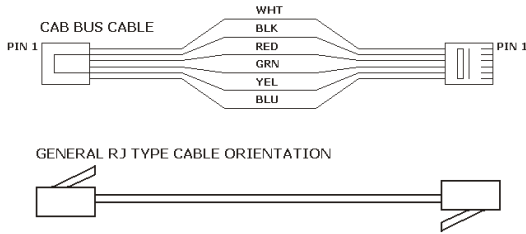


Figure 2

This means that Pin 1 of the connector at one end of the cable must be connected to Pin 1 of the connector at the other end of the cable as shown in Figure 2. Note that normal telephone cables are **NOT** wired this way.

## Operation

When the Fast Clock Display is first powered, it will display its software revision number for two seconds ("r1.00"). If the Fast Clock Display receives a time message from the NCE command station, it will change to displaying the time after the revision number. If not, the display will show "--:--" until it receives a time message. This will occur when the time changes. For example, if a 6:1 fast clock ratio is configured, then time messages are sent every 10 seconds.

If the Fast Clock Display does not see any communications on the cab bus for a half second, the time display will change back to "--:--" and remain this way until communication returns and a new time message is received. This can only occur if the Fast Clock Display remains powered when communications halt.

See your NCE manual for information on configuring the fast clock feature, including selecting of either 12- or 24-hour format. The Fast Clock Display will display what it is sent, meaning that all configuration is performed with the command station. In 12-hour format, the colon on the display will blink at a 1 Hz rate (1/2 second on, 1/2 second off).

## Using External Power Supply

The Fast Clock Display has a jack for providing external power. NCE recommends using external power when the cab bus is longer than 30-40 feet, but extra loads from either cabs or our Fast Clock Display can decrease this length.

Connecting a power supply to a Fast Clock Display will power the downstream cab bus as well as the Fast Clock Display. The power supply, which can be a "wall wart" type supply should provide 12 to 14 volts DC. The jack accepts a barrel plug, 3.5 mm outer diameter and 1.3 mm inner diameter.



Figure 3

As shown in Figure 3, the centre must be negative, and the outer sleeve must be positive. The Fast Clock Display has diode protection from a wrong polarity power supply. If a power supply is connected to a Fast Clock Display on its own and nothing appears on the display, the polarity of the power supply is incorrect.

## Future Feature

The software and hardware of the Fast Clock Display has a feature that allows the display to be used as a time and temperature display sign. In the future, *Circuits4Tracks* plans to market a small display for use on the layout for this purpose.

This feature is enabled with the use of one or two jumpers on the circuit board. However, no jumper header is installed on the board at this time.

If you are interested in experimenting with this feature, the location for the jumper that controls this feature is labeled **JP1** on the circuit board. This is located in the upper-left corner of the circuit board if viewed from the front. The top position is labeled **C** and the bottom is labeled **F**. If adding a 2x2 header for jumpers, it is recommended that it be installed on the bottom of the circuit board in order to make it easier to change the jumpers when the Fast Clock Display is installed on the fascia of your model railroad.

When no jumpers are present, the display shows only time.

When a jumper is placed in the **C** position, the display alternates between time and temperature in Celsius. When a jumper is placed in the **F** position, the display alternates between time and temperature in Fahrenheit. With a jumper in both positions, the display cycles time-Celsius-time-Fahrenheit.

When a temperature mode is selected, each display (time or temperature) will appear for about 2.5 seconds. Jumper(s) must be in place when the Fast Clock Display powers up. Adding or removing jumpers while it is running will not change the operation.

The temperature feature uses an on-chip temperature sensor, which is reading processor's core temperature. This is within a degree or two of room temperature. To simulate temperature fluctuations over a 24-hour period, the reading is altered based on the time being displayed. Temperature is reduced a few degrees during the night and increased a few degrees during the day.

## Warranty

A factory-assembled Fast Clock Display is tested and warranted against manufacturing defects for a period of 1 year from date of purchase. As the circumstances under which this unit is installed cannot be controlled, failure due to installation problems cannot be warranted. This includes misuse, miswiring, and use of an optional power supply that does not provide direct current or is rated for more than 14 volts.

If the Fast Clock Display fails for non-warranted reasons, its circuit board can be replaced with no questions asked for the cost of \$35 plus shipping (this fee subject to change).

Send an email to [circuits@daxack.ca](mailto:circuits@daxack.ca) for information on warranty or non-warranty replacement.

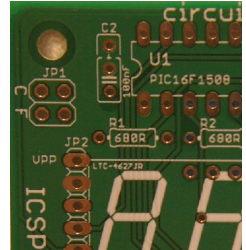


Figure 4

*This document is available in PDF format on our website.*