# High speed serial point-to-point Asynchronous RS232 or RS422 communication over Fiber Optic Ring Network

**Application Note No. AN-PP-01. Release 1. Date 22 July 2015.**
**Circulated by Cygnus Microsystems (P) Limited, Hyderabad**

## Connectivity Solution for accessing a number of remotely located devices communicating to a central site using serial asynchronous interface over an Optical Fiber Ring Network

RS232, RS422 and 20 mA Current Loop serial port interfaces have been used for communications since many decades. The simplicity of connection and ease of transmission in asynchronous format has kept up the interest of the user community in RS232. The RS422 or 20mA current loop interface do the same for specialized applications in which longer distances are required to be covered, or where the connections are prone to noise.

Using optical fiber medium to carry serial data could add a new dimension to serial communications, because of the several inherent advantages of fiber over copper. Unlike copper media, fiber is non-metallic, and is therefore immune to interference from electrical disturbances – this is a common problem when copper media runs close to high-voltage supply lines. Other advantages of optical fiber include its large data carrying capacity, and its long range of operation (without repeaters) - easily spanning a few kilometers.

However RS232, RS422 and Current Loop interfaces are specified to work over copper media. How then can fiber media be used to transport data received from these interfaces? A solution is possible by using an underlying fiber optic network that offers the required long distance connectivity, and provides the required RS232, RS422 or Current loop interface at user locations. A CYGNUS 894 network is such a solution. In fact a CYGNUS 894 network allows not just one, but multiple point-to-point full-duplex connections to be established between a central server and a number of distributed remote locations with RS232, RS422 or current loop interface.

As shown in Fig. 1, a CYGNUS 894 network consists of a CYGNUS 894C central node (which has up to eight serial ports for connecting to the central server), and as many as 8 CYGNUS 894R remote nodes at user locations. Each CYGNUS 894 unit connects to the previous unit and the next unit in the network using its 2 fiber ports. The last CYGNUS 894R unit may be connected back to the central site CYGNUS 894C unit to close the “ring” - but this is not mandatory.

If a ring is indeed formed, the network's “ring protection” feature becomes available. This feature provides fault tolerance and resilience which allows the ring to continue providing connectivity to all devices even if a fiber segment fails. The algorithm used to provide “ring protection” transparently re-routes data in the opposite direction if a fiber segment in the network fails.

User devices can connect to the CYGNUS 894 network at speeds in excess of 430 kbps (depending on the type of user interface). RS422 interfaces allow the highest speed – as much as 921 kbps in direct PC-PC (or DTE-DTE) applications. A CYGNUS 894 network can have up to eight remote nodes. Each remote node can independently have RS232, RS422 or 20mA current loop interface. On the central node the interfaces possible are RS232 or RS422.

It may be mentioned here that a CYGNUS 894 network can also be used for ethernet bridging (LAN extension) between a central site and remote nodes. Special versions of remote CYGNUS 894R and central CYGNUS 894C nodes with ethernet interface are required. For more information please refer to CYGNUS Application Note AN-LE-02. A hybrid network with some CYGNUS 894R nodes having RS232/RS422/current loop interface, and other CYGNUS 894R nodes having ethernet interface, is also possible. An appropriately configured CYGNUS 894C unit is required at the central site in this case.

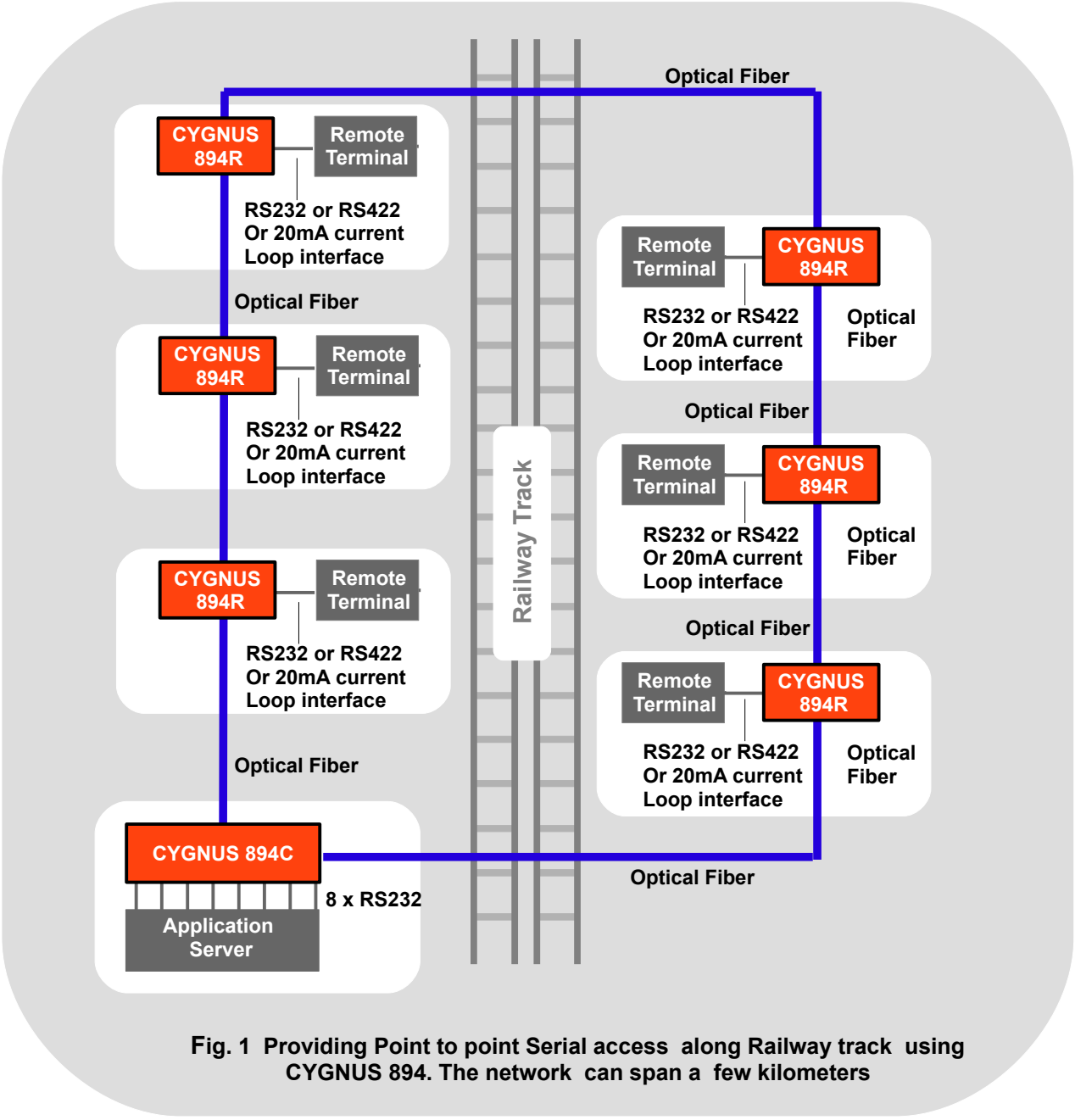


**Fig. 1 Providing Point to point Serial access along Railway track using CYGNUS 894. The network can span a few kilometers**

Contact Cygnus today for further information

**CYGNUS MICROSYSTEMS (P) LIMITED**
93, IDA Phase II, Cherlapally, Hyderabad 500 051, India. Tel: (40) 27261326
Web: www.cygnusmicro.com E-mail: mktg@cygnusmicro.com

ISO 9001:2008 Registered