

# The FAQs of Life About G.703

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## *Questions and Answers Regarding 2.048 Mbps G.703*

Talk to five "datacom types" about G.703 communication and you're likely to recall the fable about five blind men describing an elephant (the one holding its trunk thinks it's like a snake, the one holding its leg thinks it resembles a tree, etc.). Only in this story the description might change based upon the country or the PTT involved. Here are some frequently asked questions about G.703 and some answers—at least from our perspective—that may help to clarify things a bit.

**Q.** I've never heard of G.703; is it the same as E1?

**A.** That's like asking if IEEE 802.3 is the same as Ethernet. The first term is very specific and technical, the second is a general umbrella category. Like 802.3, CCITT/ITU Recommendation G.703 is a specific standard covering physical and electrical characteristics of a digital interface. In the case of G.703, it presents a standard method for encoding clock and data into a single signal. The principles in G.703 are applicable to interfaces with data rates ranging from 64 kbps to 2.048 Mbps. The Patton Model 2703 G.703 digital modem is designed for 2.048 Mbps networks.

**Q.** Who provides G.703 service and how would I use it?

**A.** Your carrier would provide you with a point-to-point link that is "unstructured", meaning that you must supply the timing ("structured" service is called G.704). You would use your G.703 link for interconnecting data communications equipment, such as bridges, routers, and multiplexers at a data rate of 2.048 Mbps.

**Q.** What if my equipment runs slower than 2.048 Mbps; can I use just a fraction of the bandwidth?

**A.** Normally, with unstructured G.703 service, the answer is "no". However, the Patton Model 2703 provides a rate adaptation function that lets you connect equipment running at 256 Kbps, 512 Kbps or 1.024 Mbps to a 2.048 Mbps G.703 network. Without a rate adapting digital modem you would need structured G.704 service, which can be supplied in 64 Kbps increments. Structured G.704 service may or may not be available from your carrier.

**Q.** Since G.703 requires that the user supply the timing (rather than the carrier), how is this accomplished?

**A.** In most cases, the user equipment at one end of the line is set up as a clock master and the equipment at the other end is set up as a slave. This is particularly important when the DTE interface is X.21 (which only has a single clock signal), as both directions of the G.703 link signal must use the same timing. If the DTE equipment has two clock signals, as is the case with EIA-530, then both ends can be set up as clock master.

**Q.** So the DTE equipment at either end provides the timing?

**A.** Actually, regulatory requirements usually prohibit the use of clocks originating

from the DTE. Therefore, the clock must be supplied by the G.703 termination equipment (DCE) to which the DTE is connected. The Patton Model 2703 can be set up as either master or slave, and can accommodate X.21, EIA-530 (RS-422) and V.35 DTE interfaces.

**Q.** If I order G.703 service from a particular carrier, what type of termination will it require?

**A.** Depending upon your geographic location and the carrier supplying the service, termination will either be balanced (120 ohm) or unbalanced (75 ohm). Balanced termination can be presented on a single DB-15 or RJ-45 connector. Unbalanced termination is presented on a pair of BNC connectors. Generally speaking, 75 ohm termination is more prevalent in the UK and Netherlands. Everywhere else that G.703 is offered, 120 ohm termination is the rule. And in fact, the new Open Network Provision standard of the EEC requires that 120 ohm termination be available throughout Europe-even in countries now standardized on 75 ohm.

Fortunately, the Patton Model 2703 comes equipped with both 75 ohm (dual BNCs) and 120 ohm (RJ-45 jack) network termination interfaces. If you are using another G.703 modem, you might find the little Patton Model 460 G.703 balun a handy solution for matching 120 ohm to 75 ohm (and vice versa), both physically and electrically.

**Q.** What is the difference between G.703 and G.704?

**A.** G.704 (along with G.732) specifies a framing structure that can be superimposed on a G.703 signal. The unstructured G.703 signal is comprised of 32 time slots of 64Kbps ( $32 \times 64\text{Kbps} = 2.048\text{Mbps}$ ). Time slot zero (TS0) is used for synchronization. Since the carrier provides no timing, all 32 time slots (2.048 Mbps) are available to the DTE for data. However, G.704 is a structured service, so the carrier "steals" the 64Kbps in TS0 to provide timing. Therefore, only 31 time slots (1.984 Kbps) are available to the DTE for data when G.704 service is provided.

**Q.** How do I decide whether to use G.703 or G.704 service?

**A.** The carrier usually makes this choice for you based upon their infrastructure. If their infrastructure is cross-connect based, they will offer G.704 service. If their infrastructure is multiplexer based, they will offer G.703 service. The Patton Model 2703 is designed to work with G.703 networks. Patton will soon be releasing G.704 products as well.

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