

"DEVICE FOR TRANSMITTING PRINTING DATA
TO PRINTERS FOR TEST PURPOSES"

The present invention relates to a device for transmitting printing data to a printer for test purposes.

5 In places where printers are produced or are put on sale, and in places where services or system maintenance therefor are provided, it is frequently necessary to provide tests or demonstrations for the printers.

10 Personal computers have heretofore been employed for such tests or demonstrations. Printing data for performing the tests are stored in floppy disks, and subsequently transmitted to the printer where the test printing is effected. Such a personal computer,
15 however, is large and expensive and is not very portable and therefore cannot be very efficiently used. Furthermore, when the printer is being sold or put on show the demonstration of its performance cannot be carried out very conveniently.

20 According to the present invention, there is therefore provided a device for transmitting printing data to printers for test purposes, the said device comprising a plurality of connectors each of which is
25 adapted to be connected to a respective one of a corresponding plurality of different kinds of printers; a corresponding plurality of interface circuits each of which is connected to a respective connector and each of which is adapted for use with the respective printer; a

storage means for storing printing data employed for test printing; and a control circuit, connected to said storage means, for selecting a desired one of the interface circuits and arranged to transmit thereto said printing data of said storage means, whereby in operation the corresponding printer is supplied with the said printing data.

Such a device may be made comparatively small and of light weight, thus providing good portability and facilitating testing of the printers.

Preferably, there is a second connector which is adapted to be connected to a remote control switch; and a second interface circuit arranged to transmit signals from the said second connector to the control circuit so that, in operation, the latter controls the printing in accordance with signals transmitted from the remote control switch.

Preferably also there is a third connector which is adapted to be connected to an additional printing data transmitting device, and there is a third interface circuit connected to the control circuit for selectively transmitting and receiving printing data thereto and therefrom, the third connector being connected to the third interface circuit for transmitting printing data thereto and therefrom, whereby printing data from the additional printing data transmitting device can be transmitted to the first-mentioned connectors.

There is preferably a time storage circuit for storing the time when a printing error has occurred or when a paper supply has been exhausted, the time storage

circuit being connected to the control circuit.

There may also be a timer circuit for setting the time from the transmission of the printing data to the printer to the response of the printer, the timer circuit being connected to the control circuit.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:-

Figure 1 is a perspective view of an embodiment of a device according to the present invention;

Figure 2 is a perspective view showing the device of Figure 1 from a different angle;

Figure 3 is a block diagram showing one example of circuitry employed in the device of Figures 1 and 2;

Figures 4 and 5 are diagrams illustrating the operation of the device shown in Figures 1 and 2;

Figure 6 is a front elevation of an assembly in which are connected a plurality of devices as shown in Figures 1 and 2; and

Figure 7 is a flow chart illustrating the operation of the device shown in Figures 1 and 2.

In Figures 1 and 2 there is shown a device 24 for transmitting printing data to printers for test purposes according to the present invention, the device 24 comprising a frame body 1 which is formed integrally with a handle 1a for carrying the device itself with one

hand. Provided on the front surface of the frame body 1 are a key board 1 for selecting a particular one of a plurality of different kinds of printer to be tested and for setting a variety of modes, and a liquid crystal display unit 3 for displaying the modes and the time. The key board 2 includes numeric value keys [0] to [9], keys A to F, and command keys [RST], [JOB], [RPT] and [SET]. The device 24 is provided with a ROM socket 4 in which is detachably mounted a storage means 5 consisting of a ROM for storing printing data used for tests on the printers.

The device 24 also has connectors 6 comprising second and third connectors 6a, 6b which are respectively adapted to be connected to a remote control switch (not shown) and to other similar testing devices 24 in order to be able to employ simultaneously a plurality of such testing devices 24.

The device 24 is further provided with first connectors 7-10 for connection to four kinds of specific printers A to D (Figure 4). In this embodiment, the tests for these four kinds of printers can be effected selectively.

The device 24 is provided with an AC adaptor jack 11 for charging a built-in Ni-Cd battery (not shown) with electricity to provide an internal power source.

The circuitry of the device 24 is shown in Figure 3. A RAM 12 is capable of establishing arbitrary test printing data by use of the key board 2. First interface circuits 13-16 are respectively connected (by means not shown) to the connectors 7-10 for use with the

printers. The first interface circuits 13-16 serve to convert the test printing data into signals suited to the printers and then to transmit the thus converted signals. Second and third interface circuits 17 are respectively connected (by means not shown) to the first and second connectors 6a, 6b for transmitting and receiving the test printing data. The circuits 17 also receive printing start and stop signals transmitted by way of the remote control switch.

The circuitry shown in Figure 3 also comprises a clock circuit 18; a stopping time storage circuit 19 for storing a print stopping time for indicating when an error has occurred or when the supply of printing paper has ceased; a built-in timer circuit 20 for setting the time from the transmission of the printing data to the response of the printer; and a control circuit 21 comprising a CPU for controlling the individual circuits.

In operation, selection of printers to be inspected is effected as follows. Subsequent to depression of the said [JOB] key during standby or after turning the power supply ON, the interface circuits 13 to 16 are sequentially selected every time the said [O] key is depressed. In conformity with this selection, as shown in Figure 4, the indication on the display unit 3 is cyclically changed. Immediately the name of the printer which is to undergo the testing is displayed, the said [SET] key is pushed down, thereby selecting the first interface circuit corresponding to that printer.

The next step is to set the details of the thus selected interface circuit. Where, for instance, a

serial type of printer is selected, its baud rate, data format or the like are set. When setting the baud rate, every time the said [2] key is depressed after pushing down the said [JOB] key, baud rates [9600], [4800], ...
5 are sequentially selected and then cyclically displayed, as illustrated in Figure 5, on the display unit 3. When a desired baud rate is selected, the [SET] key is depressed, at which time this baud rate is set.

10 The proper setting is effected by operating the corresponding keys with respect to other data.

After the setting has been done in the above-mentioned manner, the printing data of the storage means
15 5 can be read out by pushing down the [SET] key. Subsequently, the printing data is transmitted from the previously-selected first interface circuit in a way adapted to the particular printer, and the test printing is thereby performed.

20 In accordance with this embodiment, the built-in timer circuit 20 is capable of setting the time of the timer by operating the appropriate key. The timer time to be set is that extending from the outputting of
25 printing data to the response on the part of the printer. If no response is given in a period greater than this setting time, an error will be displayed on the display unit 3.

30 If a signal indicating an empty paper tray, or an error, stop signal and so on are sent from the printer during the printing, the exact time should be stored in the stopping time storage circuit 19 and displayed on the display unit 3, whereby the stopping time can be

confirmed.

5 The remote control function of the device will now
be described. Referring to Figure 1, the second
connector 6a is arranged to be connectable to the remote
control switch. With this arrangement, the printing can
be started and stopped by operating the remote control
switch. The signal from the remote control switch is
transmitted via the interface circuit 17 shown in Figure
10 3. The signal is then inputted as a start or stop signal
to the control circuit 21. Therefore, by separately
manufacturing a switch box which is connected via a
cable to the second connector 6a, it is possible to
control the printing from a location far from the
15 printer, which facilitates the testing of the printer,
especially on the production line.

20 The description given above has dealt with the
case in which fixed printing data stored in the storage
means 5 are printed. In accordance with this embodiment,
however, the user is able to arbitrarily set the test
printing data by using the RAM 12. The setting of
printing data in the RAM 12 and the setting of the
number of repetitions of printing is effected by
25 operating the proper keys simultaneously when specifying
an address and setting the data. In the case of
effecting printing on the basis of the printing data set
in RAM 12, the readout of the printing data from the
storage means 5 is inhibited by pushing down the said
30 [C] key after depressing, for instance, the said [JOB]
key, with the result that a change-over is effected to
perform printing based on the data given from the RAM
12. The change-over of printing data to the storage
means 5 involves the step of depressing the said [C] key

after depressing the said [JOB] key once again.

5 An explanation will now be provided as to how to simultaneously carry out the inspections of a plurality of printers by simultaneously transmitting the same printing data from a plurality of devices 24 connected to each other through connectors by means of a cable. In such a case, as illustrated in Figure 6, a plurality of connector units 23 are mounted on and electrically connected to a piece of flat cable 22. The connector units 23 are connected to connectors 6 of a plurality of devices 24, each of the devices 24 having the construction of the device 24 described above. The master function is assigned to one of these devices 24, and the others may be regarded as slaves. The slave devices are simultaneously driven in accordance with the printing data sent from the master device, thereby executing the testing of the printers connected to the slave testing devices at the same moment.

20 In the case described above, it is required that the testing devices be forced to function as the master or slaves at the time of setting up the equipment. The setting process will now be described in conjunction with the flowchart shown in Figure 7. Where the device 24 of the present invention is, as explained earlier, used as a single unit, the process begins with the inputting of a power supply while depressing any one of the numeric keys, the particular key being referred to at (b) in Figure 7 as the "ten key". As a result, the interface circuit 17 shown in Figure 3 does not function, and the printing data of the storage means 5 or of the RAM 12 is transmitted from any one of the interface circuits 13 - 16 to the printer (step (1) in

Figure 7), thereby performing the printing.

5 Next, in the case of employing the devices 24 as
the slaves, the power supply is first inputted while
depressing any one of the command keys, as a result of
which the readout of data from the storage means 5 as
well as from the RAM 12 is inhibited (step (2)).
Subsequently, the interface circuit 17 is changed over
to receive the data from outside, and the thus received
10 printing data is in turn transmitted from any one of the
interface circuits 13-16 (step (3)), thus functioning as
the slaves.

15 Where the device 24 is set to behave as the
master, the power supply is inputted, while any one of
the numeric keys and of the command keys are
simultaneously depressed. Consequently, the interface
circuit 17 is changed over to transmit the data (step
(4)), and the data transmission from the interface
20 circuits 13-16 is inhibited (step (5)). Then, the
printing data from the storage means 5 or from the RAM
12 is sent from the interface circuit 17. The printing
data is received by the slave devices 24 connected to
the cable 22 of Figure 6. The slave devices 24 supply
25 the printing data via any one of the interface
circuits 13-16 to the printers, in which places the
testing is carried out.

30 Note that in the above-mentioned embodiment the
storage means involves a ROM, but instead, if a floppy
disk is employed, a substantial increase in the capacity
for the printing data can be obtained.

The date and time at which the test printing has

been effected can be printed out by transmitting an output of the clock circuit 18 as an item of the printing data.

5 In the device 24 described above, the number of interface circuits 13-17 and of the connectors 6-10 which are provided corresponds to that of the plurality of different kinds of specific printers for which the device 24 is designed. The interface circuits 13-17 are
10 selected in accordance with the printers to be tested, and the test printing is performed by transmitting the printing data of the storage means 5. Such a device 24 can be constructed so as to be comparatively small and light, thus providing good portability. It is therefore
15 possible to perform testing on the production line and in the course of demonstrations at shops or while presenting the devices 24 on show. Hence, the effects on production, sales, maintenance and service are excellent.

20 The connectors 6 connectable to the remote control switch permit the control from a location far from the printers, which is very convenient during tests on the production line.

25 Moreover, it is possible to simultaneously test a plurality of printers by arranging that the interface circuits 17 for selectively transmitting and receiving the printing data are connected to other slave devices,
30 and these slaves are simultaneously driven on the basis of the printing data given from the master device. As a result, the labour required for the testing on the production line can be reduced.



CLAIMS

1. A printing data transmitting device for transmitting printing data to printers for test purposes, the said device comprising a plurality of connectors each of which is adapted to be connected to a respective one of a corresponding plurality of different kinds of printers; a corresponding plurality of interface circuits each of which is connected to a respective connector and each of which is adapted for use with the respective printer; a storage means for storing printing data employed for test printing; and a control circuit, connected to said storage means, for selecting a desired one of the interface circuits and arranged to transmit thereto said printing data of said storage means, whereby in operation the corresponding printer is supplied with the said printing data.

2. A device as claimed in claim 1 in which there is a second connector which is adapted to be connected to a remote control switch; and a second interface circuit arranged to transmit signals from the said second connector to the control circuit so that, in operation, the latter controls the printing in accordance with signals transmitted from the remote control switch.

3. A device as claimed in claim 1 or 2 in which there is a third connector which is adapted to be connected to an additional printing data transmitting device, and there is a third interface circuit connected to the control circuit for selectively transmitting and receiving printing data thereto and therefrom, the third



connector being connected to the third interface circuit for transmitting printing data thereto and therefrom, whereby printing data from the additional printing data transmitting device can be transmitted to the first-
5 mentioned connectors.

4. A device as claimed in any preceding claim in which there is a time storage circuit for storing the time when a printing error has occurred or when a paper supply has been exhausted, the time storage circuit
10 being connected to the control circuit.

5. A device as claimed in any preceding claim in which there is a timer circuit for setting the time from the transmission of the printing data to the printer to the response of the printer, the timer circuit being
15 connected to the control circuit.

6. A printing data transmitting device substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

7. A device for inspecting a printer,
20 comprising: first interface circuits provided respectively for a plurality of kinds of printers; first connectors for connecting a respective one of said first interface circuits to each of said printers; a storage means for storing printing data employed for test
25 printing; and a control circuit for selecting a desired one from said first interface circuits and transmitting said printing data of said storage means to said corresponding printer which is, in turn, allowed to perform the printing.



8. A device as set forth in claim 7, further comprising: a second connector connectable to a remote control switch; and a second interface circuit for transmitting signals from said second connector to said control circuit and permitting said control circuit to control the printing based on said remote control switch.

9. A device as set forth in claim 7 or 8, further comprising: a third interface circuit for selectively transmitting and receiving said printing data; and a third connector for transmitting said printing data from said third interface circuit and supplying said printing data from outside to said third interface circuit, characterized in that said printing data from outside are sent to said printers connected to said first connectors, thereby effecting the printing.
