

SK-201 Peripheral Processor Paper Tape Reader Emulation

Technical Description and User Guide

©1997, Network Security International Limited
6 Oak Road
Clanfield
Hampshire, PO8 0LJ
www.nsi-ltd@demon.co.uk

TECHNICAL DESCRIPTION : TD-201 ISSUE E.

Date : 6th April 1994.
Author : Stephen C. Williams

PERIPHERAL PROCESSOR - PAPER TAPE READER EMULATION

1 INTRODUCTION

Model SK-201 offers a direct plug compatible serial RS-232 interface paper tape replacement.

It is suitable for upgrading any existing equipment designed to incorporate the GNT model 28 paper tape reader. Many other paper tape readers can be replaced simply by means of rewiring the connector configuration to suit.

The basic unit offers a variety of flow control and word format options for the serial interface. The polarity of each of the control lines to the paper tape emulation connector are user selectable. Likewise, the eight data lines can be selected as active high or active low. An additional feature allows for only seven data bits to be taken from the RS-232 port, the eighth bit is then added by the unit in order to generate an overall even parity word. Odd parity generation can be supplied in lieu, to special order only.

Operating from a single +5 volt D.C. supply the interface may be incorporated into many existing equipments. A full 3-RU 19 inch rack mounting panel version can be supplied to order, as a mains powered variant.

Software version, SK201-006, has been introduced in this issue. Its purpose was to introduce easier control over the error state and resumption of normal operation following an error. SK201-005 is still required for applications similar to Klippon which report an error by the transmission of a character with intentional parity error.

2 SERIAL COMMUNICATIONS PORT

All serial port connections are via a standard 25 way miniature 'D' connector. Single board versions offer a female connector, rack mounted units offer a male connector as standard.

Pin connections applicable in both circumstances are given on the following page.

2	TxD	out	Transmitted data. Used to send control codes to the sending device when a DCn flow control code option is selected. e.g. XON / XOFF.
3	RxD	in	Received data. Data to be fed via the paper tape reader emulation port.
4	RTS	out	Request to send. Hard wire flow control line to sending device. When selected a +ve level out of this pin allows the sending device to feed data into pin 3.
5	CTS	in	Clear to send. Must be either left open circuit or have a steady +ve level applied to allow DCn codes to be sent from pin 2.
6	DSR	in	Data set ready. Normally to be held at a +ve level. Used to reset an error condition by dropping DSR to a -ve level before returning it back to it's operational (+ve) state. Software version SK201-006 introduced the ability to reset the unit at any time by dropping DSR to a -ve level.
7	GND	n/a	Common signal ground connection.
8	DCD	in	Data carrier detect. Not used.
20	DTR	out	Data terminal ready. A +ve level out of this pin tells the sending device that the interface is powered up and in a good state. This pin can be selected to go -ve for flow control purposes. In the event of either a buffer overflow or data format error DTR will be lowered. See DSR for the procedure on resetting an error condition.
22	RI	in	Ring indicator. Not used.

2.1 SERIAL DATA FORMAT.

Asynchronous start-stop data is used with -ve representing the mark or stop bit level. Different user selectable format options are available. Switches on DIL switch SW3 are used for this. (SW3 is the 8-switch package.)

Software versions SK201-001 to -005 inclusive required power to be cycled in order that new switch settings were acted upon. Version SK201-006 introduced a continuous monitor of the switch status and re-initialises the unit whenever a change of switch is detected.

Switches 1,2, and 3 control the baud rate as follows :

BAUD RATE	SW1	SW2	SW3
75 or 19,200*	closed	closed	closed
110	open	closed	closed
300	closed	open	closed
600	open	open	closed
1200	closed	closed	open
2400	open	closed	open
4800	closed	open	open
9600	open	open	open

* 75 baud, rev SK201-001 to -005 inclusive,
19,200 baud from rev -006 onwards.

Switches 4.5, and 6 control the serial word format :

DATA BITS	PARITY	STOP BITS	SW4	SW5	SW6
8	None	1	closed	closed	closed
7	Even	1	closed	open	closed
7	Odd	1	open	closed	closed
8	None	2	closed	closed	open
7	Even	2	closed	open	open
7	Odd	2	open	closed	open
7	Even	1	open	open	closed
7 **8	Even **None	2 **1	open	open	open

Notes

(*) The error recovery process in all cases requires DSR to be dropped. With software version SK201-005 during these cases the error response is also indicated by transmission of a character with intentional parity error, thus enabling the error condition to be detected by the sending equipment.

Version SK201-006 software provides both modified error processing and a modified word format option for the final condition shown in the above table, (**). In the special cases marked, (*), DSR need not be dropped. In which case a time delay of about ten seconds will elapse after which time the unit will re-initialise and continue normal operation. Cycling DSR before the expiry of this timer function will directly command initialisation as in the normal operating modes.

2.2 FLOW CONTROL OPTIONS

Switches 7 and 8 select the method of flow control. A 128 character buffer is provided. The data flow control is turned off when this buffer becomes 3/4 full. Data is re-enabled when the capacity drops below 1/2.

Flow control options include control-character and hard-wire methods. Both normal XON/XOFF (DC1,DC3) control and secondary DC2/DC4 control are available. Use of these allows for three wire connection using pins 2,3 and 7 of the serial communications connector.

Hard-wire control may simply toggle RTS (pin 4) or both RTS and DTR (pins 4 and 20).

The switch settings are as follows :

FLOW CONTROL METHOD	SW7	SW8
DC1/DC3 (XON/XOFF)	closed	open
DC2/DC4	open	open
RTS only	closed	closed
RTS & DTR	open	closed

3 PAPER-TAPE READER FORMAT AND CONTROL.

The paper-tape reader output from the printed circuit assembly is at 14 pin DIL socket, SK3. This is pin compatible with the similar connector found at the rear of a G.N.T. model 28 reader. Only one difference exists. The 5 volt D.C. output provided by the G.N.T. model 28 (pin 14) is not available with the SK-201 emulator.

Pin connections, signal names, and their use are defined in the table shown on the following pages:

1	n.c.		No connection
2	FORW	in	<p>Forward. This is the main data request signal from the host system. Data is provided both in response to the rising edge of FORW and also automatically should FORW remain asserted. The active polarity of FORW is controlled by LK8 . (Pin a is that nearest to SK3)</p> <p>FORW -ve edge sensitive with active low for continuous operation. Connect LK8/a to LK8/b.</p> <p>FORW +ve edge sensitive with active high for continuous operation. Connect LK8/b to LK8/c.</p>
3	RON	out	<p>Reader-on. This output is asserted whenever the emulator is powered up and has not registered a communications error.</p> <p>It serves to indicate error conditions to the receiving device (e.g. Machine tool controller.).</p> <p>The procedure required to reset an error condition is to un-assert DSR at the RS-232 interface. This would normally be connected to a DTR signal at the host system. This should be able to be controlled (e.g. By selecting off- line) in order to recover from error conditions.</p> <p>The active polarity of RON can be selected to be active high or low by setting SW2/2 accordingly.</p>
4	READY	out	<p>Ready . This output is asserted whenever a character is presented at the data outputs.</p> <p>It is un-asserted in response to FORW until another character is available. When FORW is continuously enabled READY will only be asserted for brief instances. A guaranteed minimum time of 35 uS is still maintained in accordance with the operating specifications of the model 28 reader.</p> <p>The active polarity of READY can be selected to be active high or low by setting SW2/1 accordingly.</p>
5	DATA-7	out	<p>This forms the parity bit output of the data presented at SK3.</p> <p>It may consist of either the eighth bit (parity or data) received by the RS-232 interface or it can be an even parity bit derived from DATA-0 through DATA-6. In the latter mode the RS-232 parity selection is only used to qualify the integrity of the RS-232 data and not the output parity at this pin.</p>
6	DATA-6	out	Output data.
7	GROUND	ref	This pin provides the 0V reference for the paper-tape reader port (SK3).
8	DATA-0	out	Output data.

10	DATA-2	out	Output data.
11	DATA-3	out	Output data.
12	DATA-4	out	Output data.
13	DATA-5	out	Output data.
14	n.c.		No connection.

All signals are TTL logic level compatible.
i.e. $0 < 0.4V$, $1 > 2.4V$.

3.1 SWITCH BANK SW2

SW2/1	READY POLARITY	Closed for active high.
SW2/2	RON POLARITY	Closed for active high.
SW2/3	DATA PARITY	Close to pass DATA-7 from the RS-232 port. Open to generate even parity always from DATA-0 through DATA-6.
SW2/4	DATA POLARITY	Closed for active high.

3.2 LINK LK8 FORW POLARITY.

a-b Negative edge, active low static.

b-c Positive edge, active high static.

Pin 'a' of LK8 is to be found at the end closest to the power connector.

4 POWER CONNECTION.

The SK-201 peripheral processor is manufactured for operation from different power sources. Configurations available are 5 volts D.C. supply or low voltage A.C. operation. For use with the latter a suitable mains transformer is available.

Connection for both options is provided by connector PL1. The connections are given below. The two options are configured during manufacture and are not interchangeable.

4.1 OPTION 001 - +5 volt D.C. operation.

Pin 1	No connection.
Pin 2	+5 Volts +/- 0.15 Volts.
Pin 3	0 Volts, ground.
Pin 4	No connection.

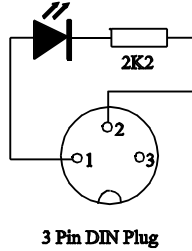
4.2 OPTION 002 - Low voltage A.C. operation.

Pin 1	No connection.
Pin 2	Transformer secondary, winding 1 start.
Pin 3	Transformer secondary, windings centre-tap.
Pin 4	Transformer secondary, winding 2 end.

5 TEST CONNECTOR

This is a three pin DIN audio connector located adjacent to SK2. Normally this is only used during board testing and carries no value in normal operation. However, software version SK201-006 introduced its use for the connection of a test LED indicator to show the current status of the unit.

5.1 CONNECTION DETAILS



5.2 STATUS INDICATION

OFF	Normal operation.
FLASHING	Waiting for DSR low or timeout.
ON	Waiting for DSR high.

