

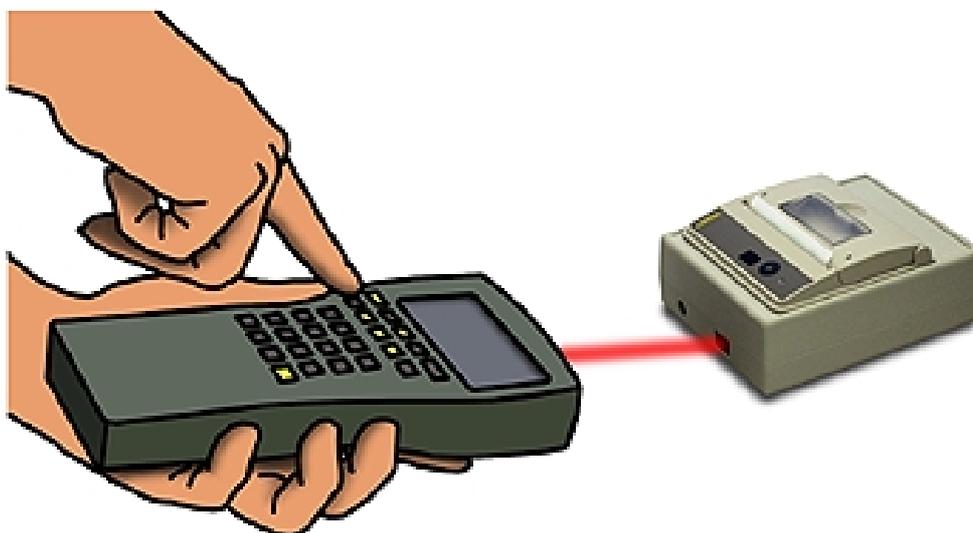
GeBE IR-Protocol Infrared-Protocol for GeBE Thermal Printer

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- **Bi-directional Transfer**
- **Handshake Mode**
- **Wireless Independence**
- **Interference-Safe**

Errors and changes reserved.
The technical data given are non-committal information and do not represent any assurance of certain features.

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0. Introduction

For wireless transfer GeBE offers a convenient infrared interface for a number of GeBE printers. The transfer is based on the SHARP IR protocol. Unlike the IrDA protocol, the Sharp IR protocol does not have any software layers that are used for communication in networks or for controlling the hardware. The Sharp IR is similar to the software layer IrCOMM of the IrDA standard. The Sharp IR provides for a simple and cost-effective optional master-slave connection to integrate the IR protocol itself into existing systems. For operation with a printer, the protocol has been extended to monitor the printer functions.

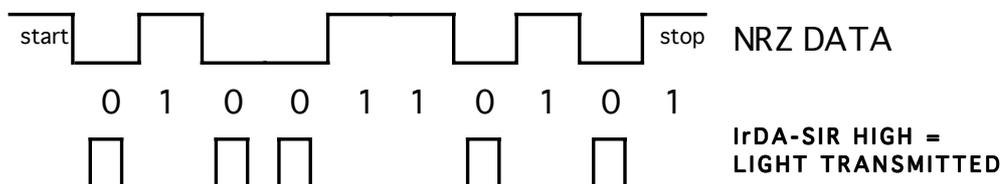
1. PC Test Program

For the first developmental phase GeBE offers a test program. The program allows the transfer of any files through a COM interface to an infrared interface. The system requirements for the program "GeBE-IR-Transmit.exe" are an IBM compatible PC, operating system Win 95 or 98, and a GeBE IR adapter GSW-IR or similar interface that connects to a COM interface.

2. Physical Characteristics

2.1. Transfer Mode

The physical transfer is compatible to the IrDA SIR hardware layer. This procedure is used for transfer rates from 2,400 bps to 115 kbps. These speeds correspond with a standard serial interface. The hardware layers IrDA FIR and 4 ppm are not supported. This puts the bit intervals between 417 μ s and 8.7 μ s (~ 20 μ s at 9,600bps). An impulse of 3/16 of the impulse width represents logic 1. The light levels are in a range between 40 mW/sr (milliwatt/steradian) and 500 mW/sr. The distance between host and receiver is specified as 1cm to 1 m.



2.2. Settings

- 9,600 baud (2,400 - 115,200 bps possible on request)
- no parity
- 1 stop bit
- infrared impulse length 3/16 bit time (~ 20 μ s at 9600bps).
- (fixed impulse length of 1.63 μ s is not possible)

After the switch from receive to transmit mode, the IR hardware needs a short time period of about 2ms. We therefore recommend to wait for 3 ms after receiving the last block before sending again.

3. Data Structure

There are two types of transmit packets.

Packet I is used for the transfer of control commands and messages, see table 1.

Packet II is used for transmitting data to the printer.

Since the IR units are not defined from the beginning, the transfer of either packet type is initiated with 5 dummy characters (00 Hex) and a START ID (96 Hex). The printer has to process at least two dummy characters correctly, before the start ID is considered.

Afterwards, the packet ID is transferred: 82 Hex for packet I , 81 Hex for packet II.

3.1. Packet I

Data Format Packet I:

	Number of Bytes	Value
DUMMY	5	00h
START ID	1	96h
PACKET ID	1	82h
DATA	1	value see table 1

Example for a transfer request: ENQ

DUMMY	START ID	PACKET ID	DATA
00h, 00h, 00h, 00h,00h	96h,	82h,	05h

3.2. Printer Status Protocol Extension for GE-2998

Four additional bytes that indicate the exact printer status are attached to both the SYN and the CAN packet. All four parameters are coded binarily.

In old software versions, these bytes should be rejected.

SYN Packet:

< 5 * NULL > < START-ID > < PACKET1 > < SYN >
< Vp-noload > < Vp-load > < Errorflags1 > < Errorflags2 >

CAN-Packet:

< 5 * NULL > < START-ID > < PACKET1 > < CAN >
< Vp-noload > < Vp-load > < Errorflags1 > < Errorflags2 >

3.2.1. Voltage Results of the Last Battery Test Command

In printers that have a battery test command, the last measured values are transmitted. Otherwise, these bytes are "0".

In order to perform a battery test, the battery test command has to be given in the last packet II. With the next SYN or CAN packet from the printer, the measured values are sent as < Vp-noload > < Vp-load >.

You can find the description of the test command in the corresponding printer manual.

< Vp-noload > :

Gives the no-load battery idle voltage immediately before the last battery test command in binary code.

< Vp-load >

Gives the load battery voltage after the last battery test command in binary code.

3.2.2. Printer Status

The following two bytes < Errorflags1 > < Errorflags2 > report the printer status.

Attention:

Some printer models do not have all error reports or messages available. In this case, all bits are always set to "0".

3.3. Packet II

The maximum data block size is 128 bytes, not including the header.

If more than 128 bytes have to be transmitted, they have to be split into several sequential blocks. For every 2-byte value, the low byte will be transferred first (BLOCK No, DLENGTH, CHKSUM).

The last block contains the block number FFFF Hex. It does not need to be completely filled to 128 bytes.

Checksum

CHKSUM is the sum (2 bytes) of all data (DATA 1-128).

Example:

Content of data block: 15h 24h 01h 55h 63h 77h 43h 77h 8Fh 9Ch
sum = 034Eh --> low byte = 4Eh high byte = 03h

Data Format Packet II:

	Number of Bytes	Value
DUMMY	5	00h
START ID	1	96h
PACKET ID	1	81h
VERSION	1	10h
BLOCK No	2 (L/H)	0001h - FFFFh
CTRL CODE	1	01h fixed
DEV CODE	1	40h fixed
ID CODE	1	FEh fixed
DLENGTH	2 (L/H)	0001h - 0200h
DATA	1 - 128	
CHKSUM	2 (L/H)	

Example for a Data Transfer:

DUMMY	START ID	PACKET ID	VERSION	BLOCK	NO	CTRL CODE
00h, 00h, 00h, 00h,00h	96h,	81h,	10h	LOW	HIGH	01h

DEV CODE	ID CODE	DLENGTH	DATA	CHEKSUM
40h	FEh,	LOW HIGH	????h	LOW HIGH

4. Software Protocol

4.1. Transfer Protocol

- 4.1.1 The host starts a "session" by transmitting a request ENQ (packet I). The printer confirms the ENQ by transmitting a SYN message.
- 4.1.2 If the host receives a SYN packet, continue with 4.1.4.
- 4.1.3 If the host receives a CAN packet, or if the selected power-down time has passed and no SYN packet has been received, the host will end the session. If the host receives any other packet, no packet, or an incomplete packet, it will start transmitting ENQ packets every 0.5 seconds (according to Sharp-IR for 6 minutes).
- 4.1.4 If the host receives a SYN packet, it will transmit a single packet II and wait for an AKN packet from the printer.
- 4.1.5 When the host receives an ACK packet, the transmission is regarded as a success.
- 4.1.6 If the host does not receive an ACK packet or another packet I within 1 second after the transmission of packet II, it will go back to step 4.1.1 and transmit the data again. The repeated data transfer after AKN will only be performed once. If this transmission also goes wrong, the session will be canceled.

A BUF packet should initiate several repeats. The number of possible repeated block transfers should not be set too low. We recommend 20 repeats. Since the print speed greatly depends on the operating voltage, the number of repeats should be determined by the lowest occurring voltage.

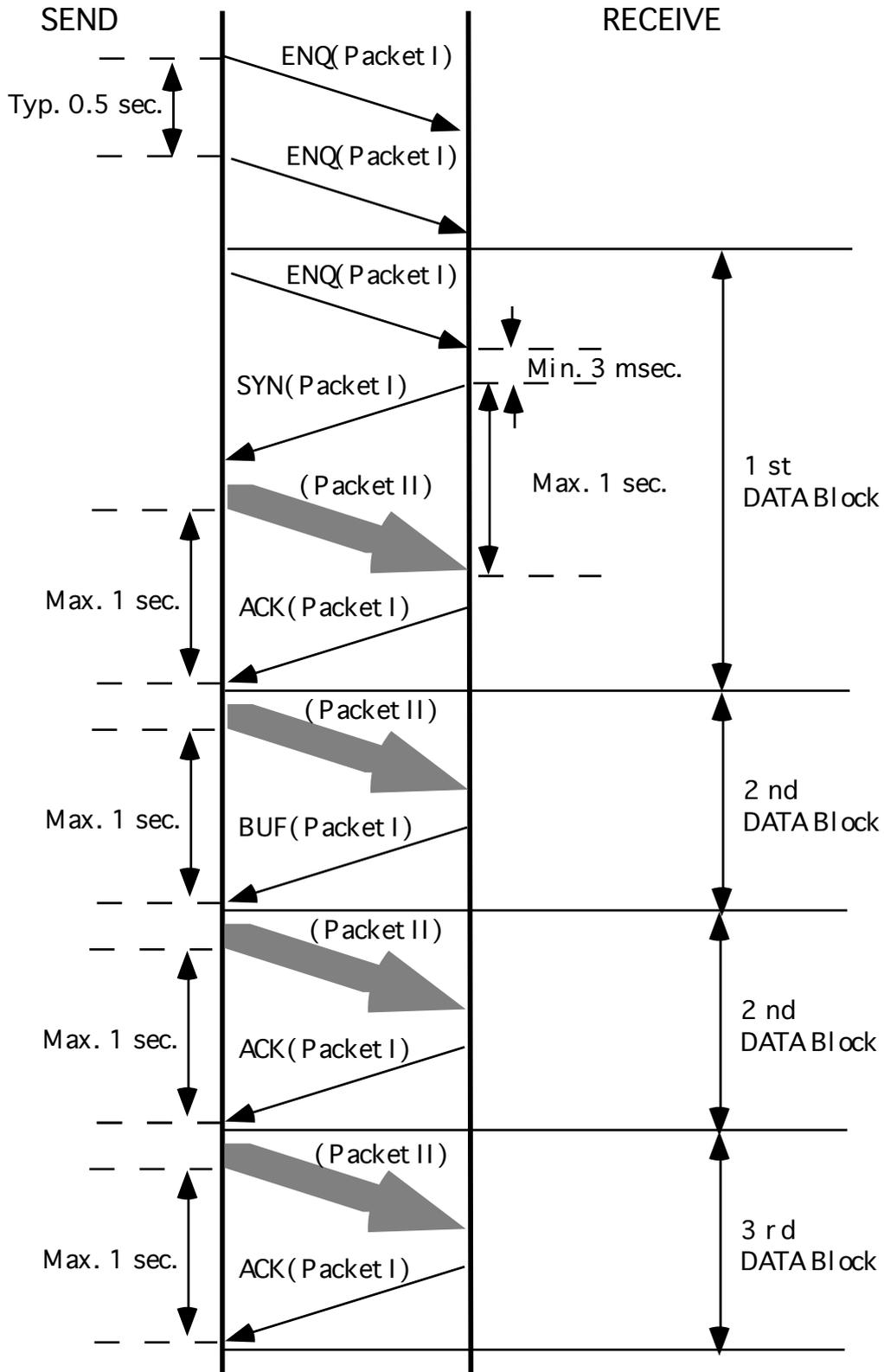
4.2. Receive Protocol

- 4.2.1 The receiver is activated by a DUMMY character. After the first recognized DUMMY, it will wait for a packet I with ENQ. If no ENQ is received before the set power-down time has passed, the printer will cancel the session and switch to sleep mode.
- 4.2.2 If the printer receives an ENQ packet, it will either transmit a SYN packet to continue the session, or a CAN packet to finish the session.
- 4.2.3 When the printer receives a valid packet II, it will transmit a packet I with ACK.
- 4.2.4 If an error occurs in packet II, or the time between two bytes is more than one second, the printer will go back to step 4.2.1. without sending an ACK. This will cause the host to transmit packet II again after 1 second.
- 4.2.5 If the checksum is faulty, the printer will send a packet I with NAK. This will initiate an immediate repeat of packet II by the host.

Attention:

The data transfer in both directions is only possible "half duplex", because transmitter and receiver both receive the signals sent by the other side plus their own transmit signals. For this reason, the transmitting party has to turn off or filter out the receive signals during transfer.

5. Timing Diagram



Buffer full !!