929~932MHz FLEX Synthesized Paging Data Receiver

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Operation Manual

Table of Contents

1. Reasons of Reissue

- This document is applicable to both loop antenna and SMA connector version of 930 MHz synthesized Paging Data Receiver (9023002XP and 9023102XP).

2. Introduction

For the larger display requirement or the industrial control applications, the Paging Data Receiver can be easily installed as a remote receiver without using cable. Once the Paging Data Receiver receives a message from the air, it may automatically send the message to the host without sensing the CTS level or it will only send the message to the host when the CTS signal is detected as asserted according to the selected message format.

To meet different applications, the Paging Data Receiver is designed with three different message formats that can be selected through the system parameter command. The first one is called the Packet format, the second one is called LED Application format and the third one is called Transparent format. For the Packet format, the response message is expected to be received by the Paging Data Receiver from the host once a message is sent up. The stored messages also can be retrieved following the host requested command. As for the LED Application format and Transparent format, the stored message can not be retrieved and the response message is not required to be received while sending up a message.

In order to minimize power consumption and to reduce interference, the Paging Data Receiver works in the standby mode most of the time once the message format is selected as Packet format. In this standby mode, the Paging Data Receiver can only send message, and can not receive any command from the host unless the CTS falling edge signal is detected. Once the Paging Data Receiver receives a new message from the air and the CTS are detected as asserted; it will send received message to the host automatically without the request of the host. After receiving a message from the Paging Data Receiver, the host shall send acknowledged response message to the Paging Data Receiver. In addition to the message transmission, the configuration parameters of the Paging Data Receiver can also be programmed by the host.

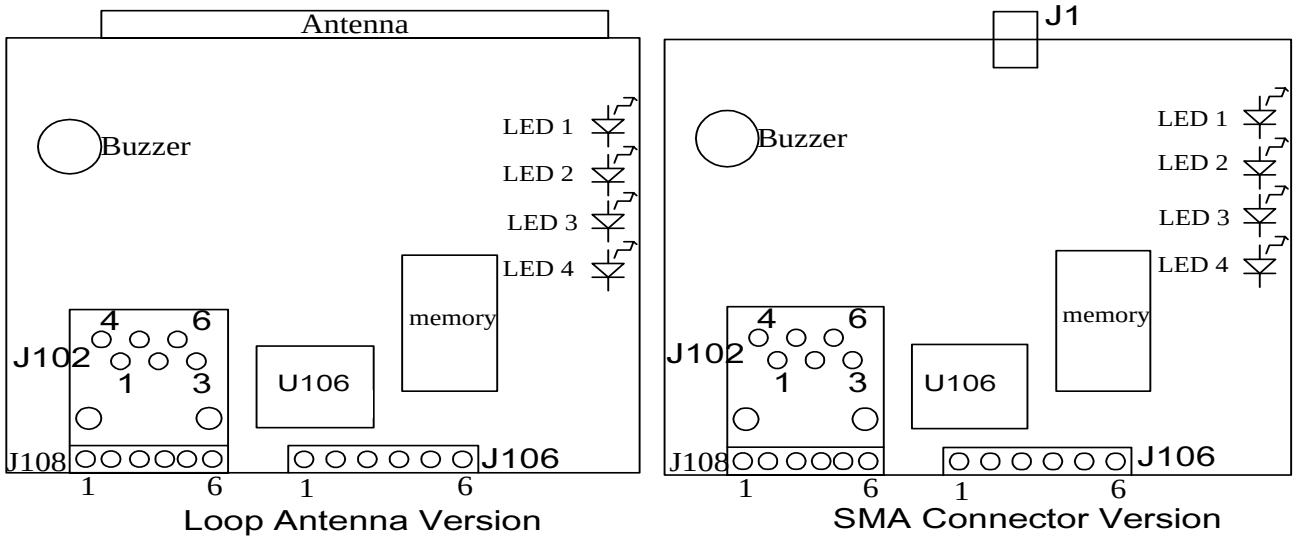
While the message format is selected as Transparent or LED Application format, the Paging Data Receiver will always work in the active mode. The Paging Data Receiver will always send the message to the host regardless of the CTS level once the Paging Data Receiver receives a new message. After receiving a message from the Paging Data Receiver, the host is not required to transmit any response message to the Paging Data Receiver. Additionally, like the Packet format,

the configuration parameters of the Paging Data Receiver can also be programmed by the host.

The detailed hardware interface and the communication protocol between the Paging Data Receiver and the host are described in the following sections.

3. Hardware Interface

For the Paging Data Receiver as shown in Figure 1, the required power supply ranging from +5V to +9V (nominally DC +6V) can be input through the J108, J102 or J106. The bipolar (full) RS-232 interface signals as shown in Figure 1 can be connected through J108 or J102. As for the unipolar (+3.3V) interface signals, they are all connected through the connector J106. Please note that the unipolar and the bipolar RS-232 signals interface can not be used concurrently. Otherwise, the +3.3V and the full RS-232 signals will cause collision problem. When using the RS-232 transceiver IC (U106), the J106 +3.3V signal interface is not allowed to be used. If the J106 +3.3V RS-232 interface signal is to be used, the RS-232 transceiver IC (U106) must be removed. For the detailed description of these signals, please refer to Section 4.



J106 (+3.3V RS-232 Interface)

Pin-1: Vin (+5Vdc~+9Vdc)
Pin-2: TXD, Output (used for the pager module to transmit data to host)
Pin-3: RXD, Input (used for the pager module to receive data from host)
Pin-4: Ground
Pin-5: CTS, Input (used for the pager module to detect if the host is on line)
Pin-6: NC (should be left open)

J108 & J102 (Bipolar RS-232 Signal Interface)

Pin-1 : Ground
Pin-2 : TXD, Output (used for the pager module to transmit data to host)
Pin-3 : CTS, Input (used for the pager module to detect if the host is on line)
Pin-4 : NC (should be left open)
Pin-5 : RXD, Input (used for the pager module to receive data from host)
Pin-6 : Vin (DC +5V ~ +9V)

LED

LED 1: Message Error
LED 2: Message Transmission
LED 3: Out of Range
LED 4: Power On

Figure 1. Pager Module Hardware Interface

In order to show the different operation status, the Paging Data Receiver is provided with four (4) LED indicators and one buzzer:

- Message Error LED: Once the Paging Data Receiver receives an error message from air, this LED will be turned ON until the next correct message is received.
- Message Transmission LED: Once the Paging Data Receiver transmits the data to the

host through the RS-232 interface, this LED will be turned ON or OFF according to the pattern of the transmitted data.

- Out of Range LED: Once the Paging Data Receiver can not receive the paging signal (i.e., Sync signal) correctly, this LED will be turned ON until the correct paging signal is received again.
- Power On LED: Once the Paging Data Receiver is turned on, this LED will be always ON until the power is off or failed.
- Buzzer: The buzzer will generate an alert tone in the following three cases:
    1. Power on: Once the Paging Data Receiver is turned on, the buzzer will generate an alert tone for two (2) seconds.
    2. Personal message reception: Once the Paging Data Receiver receives a private message, the buzzer will generate the same alert tone as case 1 if the message alert tone function of the system parameter (See Section 6.2) is set as ON.
    3. Communication failure detection: This LED is only used for the Packet format. If the Paging Data Receiver detects the communication between the Paging Data Receiver and the host is abruptly disconnected by sensing the CTS signal level, the buzzer will generate a long beep tone for three (3) seconds.

4. RS-232 Data Format

An RS-232 serial port is used between the Paging Data Receiver and the host, and four (4) signal lines are included: TXD, RXD, CTS, and GND. The functions of these signals for the Paging Data Receiver are:

- TXD: This output signal is used to transmit data to the host.
- RXD: This input signal is used to receive data from the host.
- CTS: This input signal will not be sensed and it is not used while the message format is selected as Transparent or LED Application format. Once the message format is selected as Packet format, the Paging Data Receiver will sense this signal to determine if the host is on line. Unless the Paging Data Receiver is required to change the operation mode, the CTS signal must be always asserted. Otherwise, the Paging Data Receiver will not send the message to the host.
- GND: Signal and power ground.

The data transmission format of the RS-232 serial port is defined as follows:

- Data Rate: 9600bps
- Data Length: 8-bit

- Parity Bit: None
- Stop Bit: 1 bit
- Mode: Half duplex

5. Message from Paging Data Receiver to Host

The messages from the Paging Data Receiver to host are mainly divided into the following three types:

1) Prompt string.
2) Received message.
3) Response configuration message.

According to the operation status, the Paging Data Receiver can be divided into two operation modes: message mode and configuration mode. Once the Paging Data Receiver is turned ON, it will be set to the message mode (default operation mode). Through the “Operation Mode Switching Command” and the optional falling edge signal on the CTS pin (only required for Packet format), the operation mode can be toggled between the configuration mode and the message mode.

In the message mode, the Paging Data Receiver will send the received paging message to the host automatically. The Paging Data Receiver cannot accept any configuration command while in the message mode. The Paging Data Receiver transmitted message format will depend on the selected format as Packet format, LED Application format or Transparent format. If Packet format is selected, besides the raw ASCII message, the message header, message trailer, message attribute and other message related information also will be transmitted to the host and the acknowledge response message (G2 or G3) is expected to be received. Additionally, the host also can request the Paging Data Receiver to send the entire stored message by send “G1” command. If LED Application format is selected, message header, message attribute, message slot, message, message end will be transmitted to the host and no response message is expected to be received. For the Transparent format, it is consisted of message and variable length of header and footer characters which can be programmed from null to 25 ASCII characters.

5.1 Prompt String

The prompt string will be transmitted to the host after power on or by detecting CTS falling edge signal. Once the message format is selected as Transparent or LED Application format, the Paging Data Receiver will only send the prompt string to the host immediately after power on. If the message format is selected as Packet format, the Paging Data Receiver will always transmit the

prompt string to the host while the falling edge signal is detected on the CTS pin. Additionally, the prompt string is also different for the Packet format and other two message formats, LED Application format and Transparent format. While the packet format is selected, the Paging Data Receiver will transmit the following confirmation string to the host:

"Tellus FLEX Pager↵" (0x54 + 0x65 + 0x6C + 0x6C + 0x75 + 0x73 + 0x20 + 0x46 + 0x4C + 0x45 + 0x58 + 0x20 + 0x50 + 0x61 + 0x67 + 0x65 + 0x72 + 0x0D)

As for the LED Application and Transparent formats, only "↵ LF"(0x0D+0x0A) will be transmitted to the host.

Note that the symbol '+' in the above format does not exist during the message transmission.

5.2 Received Message

Once the Paging Data Receiver receives messages from the air, it will send the received messages to the host according to the selected message format on the system parameter, assuming that the Paging Data Receiver is in the message mode. Once the message format is selected as Packet format, the Paging Data Receiver will only send the message to the host while the CTS signal is detected as asserted. If the message format is selected as Transparent or LED Application format, the Paging Data Receiver will always transmit the message to host regardless of CTS level. The message format for the Packet, LED Application and Transparent format are explained respectively as follows:

Packet Format: Message header + Message attribute + Message number + Message time stamp + Message length + Message + Message end + Checksum

Note that the symbol '+' in the above format does not exist during the message transmission.
The detailed description of each field is described as follows:

- Message header：Four (4) bytes of fixed data pattern, "0x01+0xAA+0xA5+0x80".
- Message attribute: Two (2) bytes of data. Each bit function of these two bytes is described as follows:

Byte 1	Bit 7-4	To indicate the set of the Capcode address where the following transmitted message is received. The valid value is 0 to 15 whereas '0' (0000) indicates the first Capcode address and '15' (1111) indicates the 15th Capcode address.
	Bit 3-0	To indicate the slot number that the following transmitted message is assigned in the Paging Data Receiver. 0 indicates that the message is assigned in the private message slot and 1-15 indicates the public message slot number where the message is assigned.

Byte 2	Bit-7	Error flag. This indicates the error flag of the following transmitted message. '0' indicates that the message is correct and '1' indicates an error message.
	Bit-6	Message unit flag. '0' indicates that the following transmitted message is organized as Hex/Binary format. '1' indicates that the message is organized as alphanumeric format. For the Hex/Binary message, the data is represented as 8-bit. Please note that, for the alphanumeric message, the data is still transmitted as 8-bit and the 8^{th} bit is always set as '0'.
	Bit-5	Message repeat flag. '0' indicates that the following transmitted message is a new message. '1' indicates that the following transmitted message is a repeated message.
	Bit-4	Continued Flag. For each packet, the maximum length of the transmitted message is limited to be 65535 bytes. '0' indicates that the following transmitted message is a completed message. '1' indicates that length of the following message is greater than 65535-byte and it is to be continued in the immediately following message packet.
	Bit-3	Unfinished Flag. '1' indicates that the message received from the air is not complete and some parts of message are lost. '0' indicates that the received message is a complete message.
	Bit 2-0	Bit2-0：Reserved for future use.

- Message number: This 1-byte field indicates the message sequence number for the transmission. The sequence number is a number with modulo-256 and it is incremented by one for each message transmission. Once the Paging Data Receiver is powered on, the message sequence number will be reset to 0. In other words, the message sequence number for the message packet transmission will start from 0 once the communication between the Paging Data Receiver and the host is set up again. Please note that the message sequence number will be always kept the same for the message fragmented by continued flag and the re-transmitted message requested by the "G2" command.
- Message date/time stamp: This 5-byte field indicates the date/time of the message reception from air. The definition for each byte is described as follows:

Byte 1	Year. This byte indicates the year ranging from 0x04 (2000) to 0x1E (2026)
Byte 2	Month. This byte indicates the month ranging from 0x00 (January) to 0x0D (December).
Byte 3	Date. This byte indicates the date ranging from 0x00(1) to 0x1E

	(31).
Byte 4	Hour. This byte indicates the hour ranging from 0x00 (AM:00) to 0x17 (PM: 11).
Byte 5	Minute. This byte indicates the minute ranging from 0x00(0) to 0x3B (59)

Note: Once the Paging Data Receiver is powered ON, the current date/time will be initially set to the default value. After that, the date/time will start to count with a minute unit increment using the Paging Data Receiver internal real time clock until the new date/time information is received either from the FLEX operator's system or set from the host. When the date/time information is set or received, the module's current date/time will be changed to be the new one. The Paging Data Receiver may capture date/time information from air many times, but only the information first time received will be used to update the current date/time. After that, the date/time information received from air will be always ignored. As for the date/time information set by the host, there is no such limitation. The Paging Data Receiver current date/time will be always changed according to the host's setting command.

- Message Length: This 2-byte field indicates the message length (i.e., number of byte) in the message field. The valid 16-bit value is from 0x0001 (1 byte) to 0xffff (65,535 byte).
- Message: This field contains the content of transparent raw ASCII message.
- Message End: This field, represented by 4-byte of data, "0x17+0xA5+0xAA+0x80", indicates the ending of the message packet transmission.
- Checksum：This field indicates the checksum value of the transmitted message packet.

  The Message Header, Message Attribute, Message Number, Message Time Stamp, Message Length, Message, and Message End are all summed by byte together. The two's complement of the lower 16-bit value of the sum is filled in the field.

LED Application Format: Message header + Message attribute + Message slot + Message + Message end

- Message header：Four (4) bytes of fixed data pattern, "0x01+0xAA+0xA5+0x80".
- Message attribute: This one byte field indicates if the following transmitted message is correct whereas 0x45 ('E') indicates an error message and 0x4F('O') indicate correct message.
- Message slot: This one byte field indicates the slot number whereas 'P' (0x50) indicates

the message is received from private Capcode address and '0' ~'7' (0x30~0x37) indicates the message is received from the 1st to 7th mail drop address.

- Message: This field contains the content of transparent raw ASCII message.
- Message End: This field, represented by 4-byte of data, "0x17+0xA5+0xAA+0x80", indicates the ending of the message transmission.

Transparent Format: <ID>+Header + Message + Footer

- ID: Source identification (Capcode address identifier), it is displayed or not, depends on the configuration data. (See 5.4)
- Header: This header field can be programmed from 0 to 25 bytes whereas the value of each byte can be from 0x00 to 0x7F. If it sets to a special string, the header would not be displayed. It will be substituted by timestamp. (See 5.5)
- Message: This field contains the content of transparent raw ASCII message.
- Footer: This footer field can be programmed from 0 to 25 bytes whereas the value of each byte can be from 0x00 to 0x7F. If it sets to a special string, the header would not be displayed. It will be substituted by timestamp. (See 5.5).

Please note that if the Subcode feature is enabled, the Paging Data Receiver will only transmit the message excluding the first four digits to host if the first four digits of the incoming message received from the first Capcode are matched with anyone of the programmed Subcodes.

5.3 Response Configuration Message

Regarding how to toggle between message mode and configuration mode, please refer to Section 6.3.

Once the Paging Data Receiver stays in configuration mode, it will send the string "T>" (0x54+0x3E) to host to indicate that it is ready to receive a new command. After receiving each configuration command, the Paging Data Receiver will respond the string "T>". In other words, the host must receive the "T>" string before sending next command. The symbol 〝↵〞 in the following response message indicates carriage return (0x0D) character. The response configuration messages are explained as below:

- T>

Indicates that the Paging Data Receiver is ready to receive a new command.

- Ann ff cc aa xxxxxxxx ss↵

This response message indicates the Paging Data Receiver internal Capcode information. All the data are represented by ASCII characters rather than the hex/binary data. For example, the Paging Data Receiver shall transmit data 0x33, 0x36 to host if the frame number, ff, is 36. And the Paging Data Receiver shall transmit 0x30, 0x34 if the alpha character, aa, is 'E'.

nn	Two ASCII characters to indicate the set number of the Capcode address. The valid value is from 00 (0x30, 0x30) to 0F (0x30, 0x3F).
ff	Two ASCII characters to indicate the home frame number of the Capcode address.
cc	Two ACSII characters to indicate the following information: Bit-7: "0" indicates that the Capcode is enabled; "1" indicates that the Capcode is disabled. Bit-6: "1" indicates that the Capcode is a public address. "0" indicates that the Capcode is a private address. Bit 5-3: Reserved for future use. Bit 2-0: Collapse number.
aa	Two ACSII characters to indicate the Alpha character of the Capcode address. The mapping table between the Alpha character and the value, aa, is described as below: 'A'=00, 'B'=01, 'C'=02, 'D'=03, 'E'=04, 'F'=05, 'G'=06, 'H'=07, 'I'=08, 'J'=09, 'K'=0A, 'L'=0B, 'U'=0C, 'V',=0D, 'W'=0E, 'X'=0F, 'Y'=10, 'Z'=11
xx	Eight ACSII characters to indicate the hexadecimal value of the Capcode address. For example, if the Capcode address issued by the system operator is 2009091, the value for xxxxxxxx should be set to 1EA803.
ss	Two ACSII characters are reserved for the future use.

- Fxxxx ↵

This is only applicable to the synthesized models. For the crystallized models, this message will be ignored. The response frequency message is represented by ASCII character rather than the hex/binary data format. Four ASCII characters, xxxx, are used to indicate the frequency mapping value ranging from "0000" (130.0000 MHz) to "FD20" (940.0000 MHz). The formula for the frequency is derived from:

(xxxx)*12.5 KHz + 130 MHz = Fc (Paging Data Receiver operating frequency).

- Sxx yy zz

This message shows the Paging Data Receiver internal system parameter that is set by the host with the command "Mxx yy zz".

xx	Must be set as “88”.
yy	Bit 7-5: Must be set “000”. Bit 4 and Bit 0: These two bits are used to indicate the selected message formats: Bit-4 Bit-0 0 0 ... Packet format 0 1 ... Transparent format 1 0 ... LED application format 1 1 ... Unused Bit 3: Must be set as ‘0’. Bit 2: Alphanumeric or Chinese message mode selection. ‘0’ indicates that the received paging message is Chinese message, ‘1’ indicates that the received paging message is Alphanumeric message. Bit 1: Message alert tone ON/OFF control. ‘0’ indicates that the Paging Data Receiver will generate an alert tone while receives a paging message. ‘1’ indicates that the module will not generate any alert tone while receives a paging message.
zz	Must be set as “03”.

- Q xx yy zz↵

This response message is reserved for the future use and should be ignored by the host.

- Y xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx

This response message is reserved for the future use and should be ignored by the host.

- Txxxx

This response message is reserved for the future use and should be ignored by the host.

- O xx nn CC1 CC2 CC3 CC4 …CCnn CCnn+1 … CC25

This response message is used to indicate the programmed header and footer. The xx is used to indicate the following characters are for header (xx=”00”) or footer (xx=”01”). The nn is used to indicate the length of the following characters of header or footer.

If the length is equal to 25, the nn must be equal to “19” . If the header or footer is not required, the nn must be set as “00” or ‘0’. The CCi indicates the i-th character of header or footer, which is formed by two ASCII characters. For example, if the first character of the header or footer is ‘A’, the CC1 must be transmitted as “41”(0x34, 0x31). Please note that if the nn is less than “19” (25), the values for CCnn+1 to CC25 should be all set as “FF”.

- O 02 CC XX XX YY YY↵

This response message is used to indicate the programmed Subcodes, Source ID and OTA. The CC is used to indicate if the features are enabled whereas the bit-0 is used to enable/disable (‘0’ for OFF and ‘1’ for ON) Subcode-1, “XX XX”, and bit-1 is used to enable/disable the Subcode-2, “YY YY”. The valid range for the “XX XX “ and “YY YY’ is 0000~9999. Bit-2 of CC is used for Source Identification, ‘1’ indicates the function enabled, ‘0’ indicates disabled. Bit-3 of CC is used for OTA switch, ‘1’ indicates OTA function enabled, ‘0’ indicates disabled.

- Bad Command!↵

Once the Paging Data Receiver receives an undefined command, it will respond this string.

- Wrong Password!↵

If the programming password received from the host command（T xx xx xx xx 1）is not “11 22 33 44”, the Paging Data Receiver will respond this message.

- Ver:xxx↵

This response message is used to indicate the software version of the Paging Data Receiver. The three ASCII characters of version number, xxx, can be numeric digits or alphabetical characters.

- RAM OK! ↵ or RAM ERROR! ↵

This response message is used to indicate the memory testing results after receiving the command, C ↵, from the host.

5.4 Source identification

It is able to program the Paging Data Receiver to include a capcode address identifier at the beginning of each message output on the COM port. This would cause an automatic insertion of 2 digits at the beginning of all serial data output. For example, if SOURCE IDENTIFICATION” mode was turned on, and the carrier delivered a message to capcode address 7 that says This is a test”, the Paging Data Receiver would output the following to the serial port: “ 07This is a test”. If the header field was programmed to the string “ 999”, then the Paging Data Receiver would output “ 07999This is a test”. The purpose of this

source identification is for system integrators that want to know which capcode the message was received on. If the source address was identifiable, the system integrator could perform additional specialized functions, such as routing the messages to different people’ s e-mail inboxes, for example, or to different LED message boards, or to different files. Please, see O CC XX XX YY YY command to realize the switch of this function.

5.5 Message Timestamp

It is able to program the Paging Data Receiver to output a timestamp prefix at the beginning or end of each message. If the special code-string “ **TSHH:MM A **” is added to the header or footer field, the Paging Data Receiver will automatically insert a timestamp string in the header or footer added to the outgoing message. For example, if “ **TSHH:MM A **” is wrote into header field and the carrier delivered a message that says “ This is a test”, the Paging Data Receiver would output “ 11:23 AM This is a test”.

6. Command Set from Host to Paging Data Receiver

The command sets from the host to the Paging Data Receiver are transmitted as the following format:

1) The first alphabetical character is used to indicate the command type. Each command set has up to five parameters.
2) The parameter is represented by ASCII character rather than the hex/binary data format. For example, if the Paging Data Receiver needs to transmit data, 3B, the Paging Data Receiver has to transmit 0x33(‘3’)0x42(‘B’). Note that the “SPACE” shown in the following commands indicates that a space character (0X20) must be inserted between parameters.
3) Each command set is ended by the line feed command ‘↵’ (0x0A).

The command sets from the host to the Paging Data Receiver can be divided into three types of commands as “Date/Time and Message Command”, “Configuration Command” and “Operation Mode Switching Command”. Please note that the “Date/Time and Message Command” is only

valid while the message format is selected as “Message Packet Format”. The detailed description of these three types of command sets are explained in the following sections:

6.1 Date/Time and Message Command

The following command is only valid while the “Message Packet Format” is selected.

- U YY MM DD HH mm (CR)

This command is used to set the module’s current date/time information. The parameter YY indicates the year whereas the value is from 0x63 (year 1999) to 0x1E (year 2030). The parameter MM indicates the month whereas the value is from 0x01 (January) to 0x0C (December). The parameter DD indicates the date whereas the value is from the 0x01 (1) to 0x1F (31). The parameter HH indicates the hour whereas the value is from 0x0 (12:00 A.M.) to 0x17 (11:00 P.M.). The parameter mm indicates the minute whereas the value is from 0x0 (00 minute) to 0x 3B (59 minutes). Please note that this command must be sent to the Paging Data Receiver within 10 seconds after the host receives the confirmation string “Tellus FLEX Pager”. Otherwise, the setting will be invalid.

- G1↵

This command is used to request the Paging Data Receiver to transmit all the stored messages. Once the Paging Data Receiver receives this command, the Paging Data Receiver shall transmit all the received messages following the message packet format. Once the Paging Data Receiver sends up a message packet, it will not start next message transmission until the message acknowledge command G 3↵ or G 2↵ is received. If the Paging Data Receiver did not receive any message from air before, it shall only transmit [Message End] string (0x17, 0xA5, 0xAA, 0x80) in the message packet after receiving the command G 1↵ and the Paging Data Receiver will enter the standby mode. Additionally, the Paging Data Receiver also will enter the standby mode after receiving command G 3↵ for the last message packet acknowledges. In the standby mode, the Paging Data Receiver will transmit the received message to the host automatically once a new message is received. The private message will be transmitted first after receiving the command G 1↵.

Please note that if the Paging Data Receiver can not receive the G1 command within five (5) seconds after transmitting “confirmation string”, the Paging Data Receiver will generate an alert tone while the CTS signal is detected as low.

- G 2↵

This command is used for the host to request the Paging Data Receiver to re-transmit the last

received message packet. Generally, this command is only used while the received message packet has error.

- G 3↵

This command is used to acknowledge the Paging Data Receiver that the received message packet is correct. Then the Paging Data Receiver can start the next message transmission. Note that if the CTS signal is detected as low level and the Paging Data Receiver cannot receive G 2↵ or G 3↵ command within five (5) seconds after finishing the message transmission, the Paging Data Receiver will generate an alert tone.

6.2 Configuration Command

The configuration commands are used for the host to set the Paging Data Receiver internal configuration parameters. All the command sets are explained as below.

- R↵

This command is used to request the Paging Data Receiver to transmit all the configuration data stored in the Paging Data Receiver except for the software version. The software version must be accessed from the command V↵.

- T 11 22 33 44 1↵

This command is used to enable the Paging Data Receiver configuration parameter programming. The “11 22 33 44” is the programming password of the Paging Data Receiver. Once the correct programming password is received, the Paging Data Receiver will respond “T >” message, and the Paging Data Receiver parameter configuration will be enabled. Otherwise, the Paging Data Receiver will respond “Wrong Password”. Please note that the configuration parameter setting will be disabled before receiving this correct programming password command.

- T nn1 nn2 nn3 nn4 2

It writes an 8-digit password into Paging Data Receiver to prevent the internal configuration parameters from read by unauthorized user. The 8-digits reading password stores in Paging Data Receiver. It would not disappear even when the power is not supplied. The reading password and the setup data of the Paging Data Receiver cannot be read out before entering the reading password. The reading password is not necessary for programming new setup data into Paging Data Receiver. The reading password always can be changed. But when you change the

reading password, the setup configuration data will be initialized. T 11 22 33 44 1 command should be ordered before this command.

- T nn1 nn2 nn3 nn4 3↵

Input 8 digits to verify with the reading password to open the function of reading setup configuration of Paging Data Receiver (R command). T 11 22 33 44 1 command should be ordered before this command.

- T↵

After finish the configuration data programming of the Paging Data Receiver, the host shall send this command to the Paging Data Receiver. Otherwise, the Paging Data Receiver can not receive message according to the programmed configuration data. This command also disables the EEPROM (used for the configuration data storage) from accidental writing.

- B xx xx xx xx nn↵

This command is used to configure the numeric digits of the Capcode address whereas xx xx xx xx indicates the numeric digits of the Capcode address in hexadecimal format for the $(nn+1)^{th}$ set of Capcode address. The valid value for nn is from 00 to 0F whereas "00" indicates the 1^{st} set of Capcode address and "0F" indicates the 16^{th} set of Capcode address.

- Aff cc aa ss nn↵

This command is used to configure other parameters of the Capcode address.

ff	Indicates the home frame number of the Capcode address.
cc	Bit-7: "0" indicates that the Capcode is enabled; "1" indicates that the Capcode is disabled. Bit-6: "1" indicates that the Capcode is a public address. "0" indicates that the Capcode is a private address. Bit 5-3: Reserved for the future use and should be set as "000". Bit 2-0: Collapse number.
aa	Indicate the alphabetical character of the Capcode address.
ss	Reserved for the future use.
nn	Indicates the set number of the Capcode address. The valid value is from 00 (0x30,0x30) to 0F (0x30,0x3F) and the other values are reserved for the future use.

- Fxx xx ↵

This command is used to configure the frequency value of the Paging Data Receiver. This is only applicable to the synthesized models. For the crystallized models, this message will be

ignored. Four ASCII characters, xxxx, are used to indicate the frequency mapping value ranging from “0000” (130.0000 MHz) to “FD20” (940.0000 MHz). The formula for the frequency is derived from:

(xxxx)*12.5 KHz + 130 MHz = Fc (Paging Data Receiver operating frequency).

- Mxx yy zz↵

This command is used to set the Paging Data Receiver internal system parameter. Once the Paging Data Receiver internal configuration parameter is read by typing ‘R↵’, the internal system parameter will be shown as “Sxx yy zz”. The parameters are defined as below:

xx	Must be set as “88”.
yy	Bit 7-5: Must be set as “000”. Bit 4 and Bit 0: These two bits are used to select the following message formats: Bit-4 Bit-0 0 0 ... Packet format 0 1 ... Transparent format 1 0 ... LED application format 1 1 ... Unused Bit 3: Must be set as ‘0’. Bit 2: Alphanumeric or Chinese message mode selection. ‘0’ indicates that the received paging message is Chinese message, ‘1’ indicates that the received paging message is Alphanumeric message. Bit 1: Message alert tone ON/OFF control. ‘0’ indicates that the Paging Data Receiver will generate an alert tone while receives a paging message. ‘1’ indicates that the module will not generate any alert tone while receives a paging message.
zz	Must be set as “03”.

- V↵

This command is used to get the Paging Data Receiver software version and the corresponding checksum value.

- O↵

This command is used to set the Header/ Footer characters for transparent message format.

O 00 xx↵

O 01 nn↵

O 02 CC1↵

O 03 CC2↵

O 04 CC3↵

O 05 CC4↵

:

:

:

:

O nn+1 CCnn↵

The xx is used to indicate the following characters is for header (xx=”00” or ‘0’) or footer (xx=”01” or ‘1’). The nn is used to indicate the length of the following characters of header or footer. If the length is equal to 25, the nn must be equal to “0x19”. If the header or footer is not required, the nn must be set as “00” or ‘0’ and the following characters are not to be transmitted. The CCi indicates the i-th character of header or footer, which is formed by two ASCII characters. For example, if the first character of the header or footer is ‘A’, the CC1 must be transmitted as “41”(0x34, 0x31). If the nn is less than 0x19 (25), the CCn+1 to CC25 is not required to be transmitted.

- O CC XX XX YY YY↵

This response message is used to set the Subcodes, Source ID and OTA functions. The CC is used to indicate if the features are enabled whereas the bit-0 is used to enable/disable (‘0’ for OFF and ‘1’ for ON) Subcode-1, “XX XX”, and bit-1 is used to enable/disable the Subcode-2, “YY YY”. The valid range for the “XX XX “ or “YY YY’ is 0000~9999. Bit-2 of CC is used for Source Identification, ‘1’ sets the function enabled, ‘0’ sets disabled. Bit-3 of CC is used for OTA switch, ‘1’ sets OTA function enabled, ‘0’ sets disabled.

- C↵

This command is used to instruct the Paging Data Receiver to execute the memory testing.

6.3 Operation Mode Switching Command

- J x↵

After power on, the default operation mode is the message mode and the 10-second timer will be reset to start counting. If the message format is selected as LED Application format or Transparent format, the operation mode can be always changed after receiving “J1” or “J2” command regardless of the CTS level. If the message format is selected as Packet format, the ways to switch the operation mode to the configuration mode based on the condition of the timer expiration are explained as follows:

- **Case 1**- The CTS signal is detected as low level and the timer is not expired after power on.

  The host only needs to send “J 2” command to the Paging Data Receiver, and then the Paging Data Receiver will enter the configuration mode.
- **Case 2- T**he CTS signal is detected as low level and the 10-second timer is expired after power on.

  The host needs to generate a falling edge signal on the CTS pin first. After detecting a falling signal on the CTS pin, the 10-second timer will be reset to start counting. As described in the case 1, before the 10-second timer expires, the Paging Data Receiver will enter the configuration mode if “J 2” command is received.

In the configuration mode, the Paging Data Receiver can only receive configuration command and will not respond any message command.

Once the Paging Data Receiver stays in the configuration mode, the host only needs to send “J 1” command to the Paging Data Receiver to change the operation mode as message mode. In the message mode, the Paging Data Receiver will not respond any configuration command.

7. OTA

To provide an easy way for the billing and customer service management, this device supports Paging Data Receiver (abbreviated to PDR) with the Over-The-Air (abbreviated to OTA) commands for the internal configuration parameters setting through the air. To prevent the OTA commands from the unauthorized interception, a password protection mechanism is also incorporated.

As we consider the length of the OTA command may exceed the limit of some paging systems, the OTA command will be limited to be valid while it is received from alphanumeric message. For some paging systems, some extra header and trailer characters may enclose the OTA command. To overcome the discrepancy between systems, the OTA command is designed to be deemed as valid if the length for header and the trailer character is less than or equal to five (5).

Additionally, an Expiration Date command that will automatically inhibit the Paging Data Receiver receiving information message once the expiration date is reached is also supported. This command will greatly relieve the loading for the system operator or the distributor for the billing management if the paging system can support the GPS time transmission.

To reduce the possible case that an arbitrary message may be recognized as one of the OTA commands, 1-digit checksum is also appended on each OTA command. Basically, the 1-digit checksum is derived by the least significant digit of the total checksum. As considering two of the following OTA commands, “Change Header” and “Change Footer”, that may consist of digits

ranging from “A~F”, the addition for the total checksum of these two OTA commands are all by hexadecimal format while the checksum of all the other commands are by decimal format.

7.1 Password

To prevent the OTA command format from unveiling, an 8-digit OTA password (00000000 ~ 99999999) is reserved for the distributor to set through the PC programming software. The OTA password is also used for the clone protection feature in the Paging Data Receiver. The clone protection feature prevents unauthorized users from reading the contents of Paging Data Receiver’s internal configuration parameters.

7.2 OTA Commands

All the following OTA commands are activated only when a completed command is received through alphanumeric message that can be tolerant up to five (5) header or trailer characters via the private Capcode address. If the command is received from the Maildrop Capcode address, the command will be regarded as a general message.

Because distributor may send the OTA command by individual or group call, two private Capcodes have to be programmed into the Paging Data Receiver whereas one is unique and the other one is in common with the other members of the same group. For the individual Paging Data Receiver’s configuration parameters change, the OTA command must be sent through the unique private Capcode address. As for a group of Paging Data Receiver’s configuration parameters change, the OTA command must be sent through the common private Capcode address.

7.2.1 Change Capcode

This command is used to change the Capcode address and set it as private or Maildrop message reception. The command format is “PPPPPPPP1NNMXXXXXXXS”, where

PPPPPPPP (00000000 ~ 99999999) is the 8-digit password,
NN is the 2-digit Capcode entry ID (01 ~ 16) whereas “01” indicates the first Capcode address and “16” indicates the 16th Capcode address,
M is the Maildrop flag whereas ‘0’ indicates the assigned Capcode address is for private message reception and ‘1’ stands for Maildrop message reception.
XXXXXXX is the 7-digit Capcode address
S indicates the least significant digit of the Total Checksum.

For example, if the Capcode address of the 3rd Capcode address is to be changed as 0012345 for

private message reception and the password is set as 11223344, then the Total Checksum = 1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + 1 + 0 + 3 + 0 + 0 + 0 + 1 + 2 + 3 + 4 + 5 = 39. The least significant digit of the Total Checksum is 9. Therefore, the “Change Capcode” command must be sent through the private Capcode address as “11223344103000123459”.

7.2.2 Lock Paging Data Receiver

This command is used to disable the message reception function for the Paging Data Receiver, or optionally disable specific address, except for the OTA command. The Lock command can be used for locking all output or locking specific address. After receiving the “Lock All” command, the Paging Data Receiver will send “SERVICE TERMINATION” string message as the regular message to the host upon receiving or power on each time. The command format for the Lock All command is “PPPPPPPP2009999999S”, where

PPPPPPPP (00000000 ~ 99999999) is the 8-digit password,
S is the least significant digit of the Total Checksum.

For example, if the Paging Data Receiver is to be locked and the password is set as 11223344, then the Total Checksum = 1 + 1+ 2 + 2 + 3 + 3 + 4 + 4 + 2 + 0 + 0 + 9 + 9 + 9 + 9 + 9 + 9 + 9 = 85. The least significant digit of the total checksum is 5. Therefore, the “Lock All” command must be sent as “1122334420099999995”.

The command format for the Lock Address command is “PPPPPPPP2NN9999999S”, where

PPPPPPPP (00000000 ~ 99999999) is the 8-digit password,
NN is the 2-digit Capcode entry ID (01 ~ 16) whereas “01” indicates the first Capcode address and “16” indicates the 16th Capcode address,
S is the least significant digit of the Total Checksum.

For example, if Paging Data Receiver address 02 is to be locked and the password is set as 11223344 , then the Total Checksum = 1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + 2 + 0 + 2 + 9 + 9 + 9 + 9 + 9 + 9 + 9 = 87.. The least significant digit of the total checksum is 7. Therefore, the “Lock Address” command must be sent as “1122334420299999997”.

7.2.3 Unlock Paging Data Receiver

This command is used to activate message reception functions previously disabled by the ‘Lock’ command. Once this command is received, the Paging Data Receiver will resume to the normal operation for message reception for the entire Paging Data Receiver or for a specific address. The command format for “Unlock All” is “PPPPPPPP3990000000S”, where

PPPPPPPP (00000000 ~ 99999999) is the 8-digit password,
S is the least significant digit of the Total Checksum.

For example, if the Paging Data Receiver is to be unlocked and the password is set as 11223344, then the Total Checksum = 1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + 3 + 9 + 9 + 0 + 0 + 0 + 0 + 0 + 0 + 0 = 41. The least significant digit of the Total Checksum is 1. Therefore, the "Unlock All" command must be sent as "1122334439900000001".
The command format for "Unlock Address" is "PPPPPPPP3NN0000000S", where

PPPPPPPP (00000000 ~ 99999999) is the 8-digit password,
NN is the 2-digit Capcode entry ID (01 ~ 16) whereas "01" indicates the first Capcode address and "16" indicates the 16th Capcode address,
S is the least significant digit of the Total Checksum.

For example, if Paging Data Receiver address 04 is to be unlocked and the password is set as 11223344, then the Total Checksum = 1+ 1 + 2 + 2 + 3 + 3 + 4 + 4 + 3 + 0 + 4 + 0 + 0 + 0 + 0 + 0 + 0 + 0 = 27. The least significant digit of the Total Checksum is 7. Therefore, the "Unlock" command must be sent as "1122334430400000007". Any Unlock command format can be used, regardless of which Lock command format was previously used.

7.2.4 Change Frequency

This command is used to change the Paging Data Receiver operating frequency and it is only applicable to the synthesized Paging Data Receiver. For the crystal type of Paging Data Receiver, it is un-effected by this command and still works on the same frequency. Once this command is received, the operating frequency of Paging Data Receiver will be automatically changed to the desired frequency channel. The command format is "PPPPPPPP499XXXXXXXS", where

PPPPPPPP (00000000 ~ 99999999) is the 8-digit password,
XXXXXXX (1300000 ~ 9329875) indicates the 7-digit frequency with 0.1KHz increment step, and
S is the least significant digit of the Total Checksum.

For example, if the operating frequency of synthesized Paging Data Receiver is to be changed as 930.2875 MHz and the password is set as 11223344, then the Total Checksum = 1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + 4 + 9 + 9 + 9 + 3 + 0 + 2 + 8 + 7 + 5 = 76. The least significant digit of the Total

Checksum is 6. Therefore, the “Change Frequency” command must be sent as “1122334449993028756”.

Please note that the channel spacing for the synthesized Paging Data Receiver is 12.5 KHz. If the 7-digit frequency is not exactly the multiple of 12.5 KHz, the Paging Data Receiver will not change the frequency while this command is received. Furthermore, the Paging Data Receiver also will not alter the frequency if the current operating frequency bandwidth is different from the 7-digit frequency bandwidth. For example, if the Paging Data Receiver is originally designated (by the PC programming software) to operate on 929~932 MHz, the Paging Data Receiver will not alter the frequency if the 7-digit frequency of this command indicates that the desired frequency to be changed is not fallen on this bandwidth.

7.2.5 Expiration Date

This command is used to set the “Expiration Date” for the Paging Data Receiver message reception and it is only applicable while the GPS time transmission service is available on the paging system. After receiving this command, the Paging Data Receiver will compare the “Expiration Date” with the internal real time clock. When the time is reached, the Paging Data Receiver will no longer receive the regular message unless the “Unlock” command is received. Then, the Paging Data Receiver will immediately send “SERVICE TERMINATION” string message as the regular message to the host upon service stopped or power on each time. The command format is “PPPPPPPP599999YYMMS”, where

PPPPPPPP (00000000 ~ 99999999) is the 8-digit password,
YY (00~99) indicates the stop service year whereas “01” stands for 2001 and “99” stands for 2099,
MM (01~12) indicates the stop service month whereas “01” stands for January and “12” stands for December, and
S is the least significant digit of the Total Checksum

For example, if the Paging Data Receiver information message reception service is to be stopped by the end of May, 2003, the YYMM must be set as “0305”. If the password is set as 11223344, then the Total Checksum = 1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + 5 + 9 + 9 + 9 + 9 + 9 + 0 + 3 + 0 + 5=78. The least significant digit of the Total Checksum is 8. Therefore, the “Expiration Date” command must be sent as “1122334459999903058”.

Please note that unless it is changed through the PC programming software, the “Expiration Date” default setting upon power on should be set as “12/2099” (December, 2099) Additionally, the “Expiration Date” should also resume to the default setting, 12/2099, while receiving the “Unlock”

command. As for the default setting of the real time clock upon power on, it should be always set as January, 2002.

7.2.6 Change Header

This command is used to define the “Header” field in the Paging Data Receiver programming, using the ASCII code. When a header field is defined, the header field will be appended to the outgoing message, in the order of “Header” + “Message” + “Footer”. The command format is “PPPPPPPP6NNHHH…HHHS”, where

PPPPPPPP (00000000 ~ 99999999) is the 8-digit password,
NN (00-50) is the length of ASCII code of characters whereas each ASCII character is consisted of 2-digit ASCII code
HHH…HHH indicates the ASCII code of the characters in the header field, from 0 to 50 characters, and S is the least significant digit of the Total Checksum

For example, if the Paging Data Receiver header field should contain “123AaZzLF whereas ‘LF’ (0x0A) indicates line feed, “31323341615A7A0A” must be filled on the HHH…HHH field and the length NN must be set as 16. If the password is set as 11223344, then the Total Checksum (using Hex addition) =
1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + 6 + 1 + 6 + 3 + 1 + 3 + 2 + 3 + 3 + 4 + 1 + 6 + 1 + 5 + A + 7 + A + 0 + A= 66 (hex value). The least significant digit of the Total Checksum is 6.
Therefore, the “Change Header” command must be sent as “11223344616313233416 15A7A0A6”.

7.2.7 Change Footer

This command is used to define the “Footer” field in the Paging Data Receiver programming, using the ASCII code. When a footer field is defined, the footer field will be appended to the outgoing message, in the order of “Header” + “Message” + “Footer”. The command format is “PPPPPPPP7NNFFF…FFFS”, where

PPPPPPPP (00000000 ~ 99999999) is the 8-digit password,
NN (00-50) is the length of ASCII code of characters whereas each character is consisted of 2-digit ASCII code
FFF…FFF indicates the ASCII code of characters in the footer field, from 0 to 50 characters, and
S is the least significant digit of the Total Checksum

For example, if the Paging Data Receiver footer field should contain “CRLF” whereas ‘CR’ stands

for carriage return (0x0D) and 'LF' stands for line feed (0x0A), the length must be set as 04. If the password is set as 11223344, then the Total Checksum (using Hex addition) = 1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + 7 + 0 + 4 + 0 + D + 0 + A = 54. The least significant digit of the Total Checksum is 4. Therefore, the "Change Footer" command must be sent as "112233447040D0A4".

7.2.8 Change Subcode

This command is used to define the "Subcode" fields in the Paging Data Receiver programming. When a subcode field is defined, a subcode value must be prefixed on all messages transmitted for that Paging Data Receiver. The command format is "PPPPPPPP8AINNNNS", where

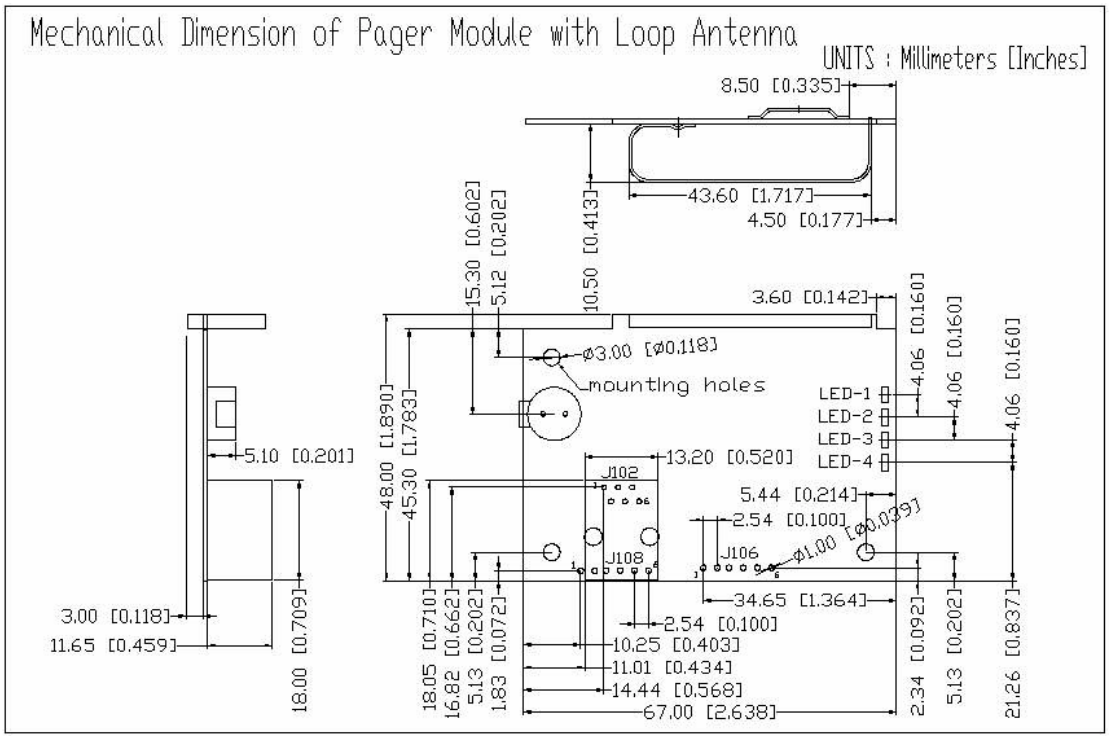
PPPPPPPP (00000000 ~ 99999999) is the 8-digit password,
A (0 ~ 1) activates/deactivates subcode processing in the Paging Data Receiver (0 is inactive and 1 is active),
I (1 ~ 2) is the subcode field to be changed, Subcode 1 or Subcode 2,
NNNN indicates the 4-digit subcode field value, and
S is the least significant digit of the Total Checksum

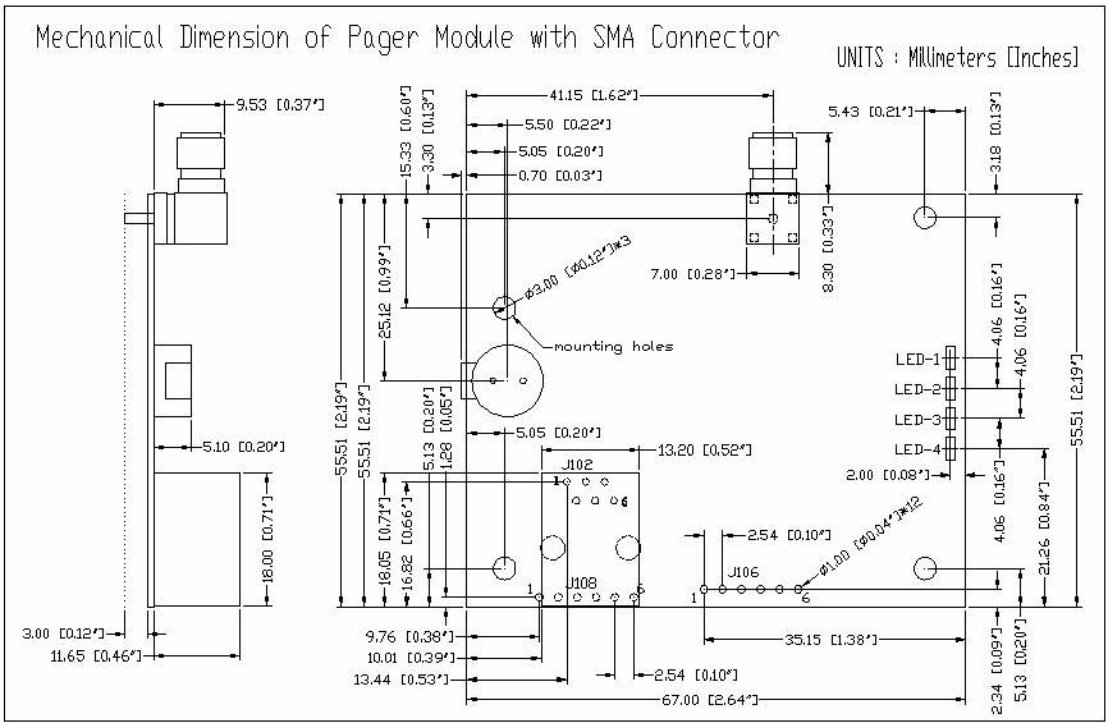
For example, if the Paging Data Receiver's Subcode2 field is to be changed to a value of "0023" and subcode processing is to be active, and if the password is set as 11223344, then the Total Checksum = 1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + 8 + 1 + 2 + 0 + 0 + 2 + 3 = 36. The least significant digit of the Total Checksum is 6. Therefore, the "Change Subcode" command value is "1122334481200236". If Subcode mode is currently disabled in the Paging Data Receiver, the exact message sent to the Paging Data Receiver should be "1122334481200236". If Subcode mode is currently activated in the Paging Data Receiver, with a subcode field value of "7654", the exact message sent to the Paging Data Receiver should be "765411223344812002 36".

8. Subcodes

The OTA commands and the subcode message prefixes used with subcode mode in the Paging Data Receiver are independent functions. Use of subcodes does not change the OTA command checksum calculations. For example, using the Change Footer example above, and using a subcode value of 0999, the actual message that should be transmitted to a Paging Data Receiver is "0999112233447040D0A4"

9. Mechanical Diagram





10. Frequently Asked Questions

Q1: How can the Capcode address be programmed through the Hyper Terminal program once a Capcode is received from the paging service provider?
Answer: The Capcode address assigned by the services provider is a decimal 7-digit or 9-digit number. It should be firstly converted into hexadecimal format before it is programmed into the Paging Data Receiver. For example, if a personal Capcode address received from the service provider is E0637455, the hexadecimal value of the Capcode will be "9BA0F". If it is to be programmed as the first set of Capcode address, the parameters for the command "B YY YY YY YY YY"and "A XX XX XX XX XX" must be set as:
1. B 00 09 BA 0F 00
2. A 00 04 04 00 00

Q2: Is there any command for the host to get the FLEX Paging Data Receiver received paging system sent GPS time?
Answer: For the current product, it is not available to read the FLEX Paging Data Receiver received GPS time from host.

Q3: What is the size of the message buffer in the paging data receiver? How many characters/messages will it hold?
Answer: Up to 20 private messages can be stored with totally up to 16 k-byte memory buffer (around 15,000 characters). As for the public message, up to 16 messages can be stored with totally up to 16 k-byte memory buffer (around 15,000 characters). The maximum character length of receiving a message is 750 character or less per message.

Q4: Why we can not clear the header/footer by using the telephone to send the OTA commands while the clear header checksum is A and the clear footer checksum is B?
Answer: The legal length range of header and footer is form 0 to 25 and the OTA commands are designed for using in the alphanumeric mode. Therefore, you can hardly work with the OTA commands by using the touch-tone phone.

Q5: Why the OTA command does not work while at least one sub-code is set to enable mode?
Answer: The OTA command message must be under the rule of sub-code. If one sub-code is set to enable mode, all other following OTA command messages should have that sub-code to be its message head; otherwise this message would be ignored.

Appendix

Parameter Configuration

Methods

The parameter configuration for the Paging Data Receiver can be either by CPS (windows programming software) or by the Hyper Terminal of windows. The CPS provides an easy, faster and automatic way to program the Paging Data Receiver. You may ask your dealer to have a copy for free. As for the configuration through the Hyper Terminal, please abide by the following steps to set the associated parameters.

Operation Procedures

The following procedures describe how to set the parameters of a Paging Data Receiver with the Hyper Terminal application program provided by the Windows program.

- OPEN Windows 95 or 98 Programs → Accessories → Communications → Hyper Terminal.
- Select the File → Property → Setting → ASCII Setup. Set the associated parameters as shown in Figure 1.

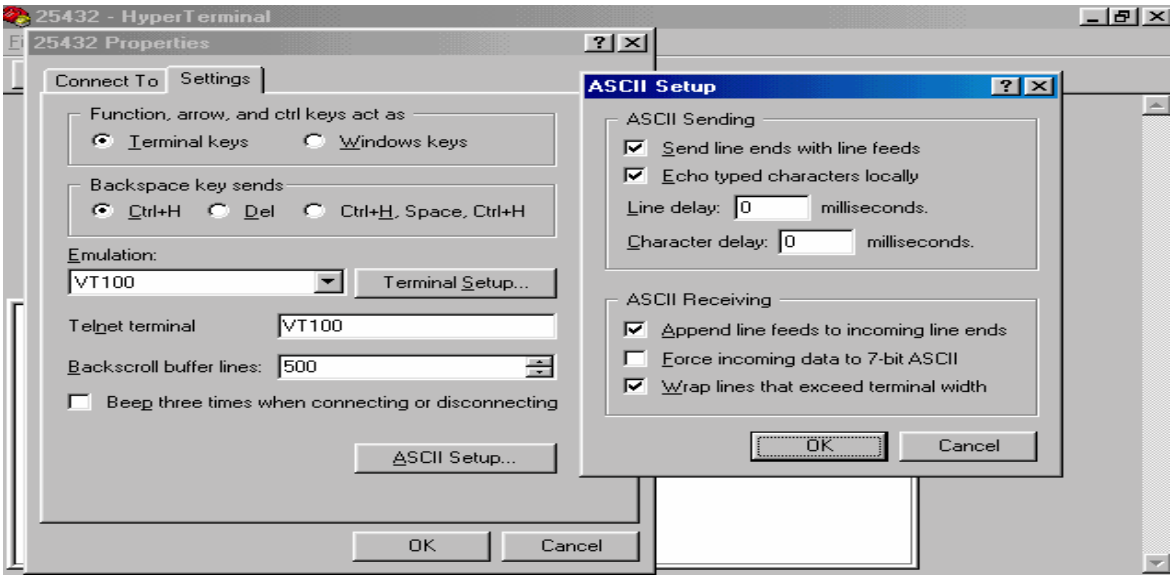


Figure 1. ASCII Setup

- Select File → Property → Connect To → Configure. Set the associated parameters as shown in Figure 2.

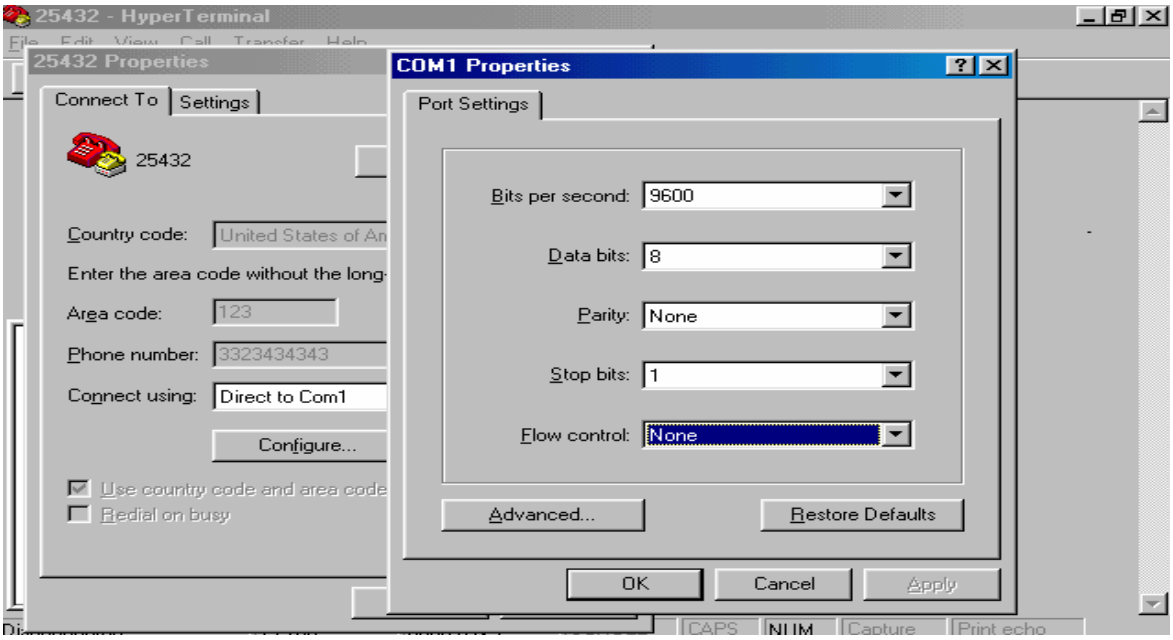


Figure 2. COM1 Properties

- Connect the Paging Data Receiver to the RS-232 serial port of a PC.
- Supply the Paging Data Receiver with the correct DC power and the pager will give off an alert tone. The “TELLUS FLEX PAGER” will be immediately shown on the screen if the message format is selected as Packet format. If the module is previously set in the Transparent or LED Application format, no text message will be shown on the screen.
- Type “J2” on the Hyper Terminal main window area within 10 seconds after the module generates an alert tone.
- Type “T 11 22 33 44 1” to enable the parameter configuration. Only after receiving this command, the Capcode address and other configuration parameters are allowed to be programmed.
- Type “T nn1 nn2 nn3 nn4 2” to write read password.
- Type “F XX XX” to set the desired frequency whereas “XXXX” is in hexadecimal format. The formula for the frequency setting is obtained as: Fc = (130 MHz) + (XXXX)*12.5 KHz. For example, if the module is to be programmed as 931.1625 MHz, then “F XX XX” must be set as “F FA 5D”.
- Type “M XX YY ZZ” to set the system parameters according to the following definition:

- XX must be set as “88’.
- YY must be set as below:
  - Bit 7-5: Reserved for future use and must be set as “000”.
  - Bit 4 and Bit 0: Set the message format.

    Bit-4 Bit-0

    0 0 ... Packet format

    0 1 ... Transparent format

    1 0 ... LED application format

    1 1 ... Unused
  - Bit 3: Must be set as 0.
  - Bit 2: Select the alphanumeric or Chinese message mode. 0: Chinese message, 1: Alphanumeric message.
  - Bit 1: Control the message alert tone On/Off. 0: ON, 1: OFF.
- ZZ must be set as “03’.
- Type “B XX XX XX XX YY” to set numeric digits of Capcode address. For example, if the string “B 00 12 D6 87 3” is typed, it indicates that:
  - 00 12 D6 87” is the hexadecimal value of the Capcode address (decimal value is 1234567).
  - “3” indicates that the input data is for the 4th Capcode.
- Type “A00 XX 04 00 NN ↵” to set the attribute of the Capcode address. If XX = 04, it indicates that the associated Capcode address is enabled and the Capcode address will be assigned to receive the private message. If XX = 44, it indicates that the associated Capcode address is enabled and the received message through the associated Capcode address will be assigned to receive public message. NN indicates the (NN+1) th Capcode address.

- Type the following command to set the header characters for the Transparent format:

O 00 00↵

O 01 nn↵

O 02 CC1↵

O 03 CC2↵

O 04 CC3↵

O 05 CC4↵

:

:

:
:
O nn+1 CCnn↵

The nn is used to indicate the length of the following characters of header. If the length is equal to 25, the nn must be equal to “0x19”. If the header is not required, the nn must be set as “00” or ‘0’ and the following characters are not to be transmitted. The CCi indicates the i-th character of header, which is formed by two ASCII characters. For example, if the first character of the header is ‘A’, the CC1 must be transmitted as “41”(0x34, 0x31). If the nn is less than 0x19 (25), the CCn+1 to CC25 is not required to be transmitted.

- Type the following command to set the footer characters for the Transparent format:

O 00 01↵
O 01 nn↵
O 02 CC1↵
O 03 CC2↵
O 04 CC3↵
O 05 CC4↵
:
:
:
:
O nn+1 CCnn↵

This command format is same as the one for header characters setting.

- Type “O CC XX XX YY↵” to set the Source ID, OTA, Subcode-1 and Subcode-2. The bit-0 of CC is used to enable/disable (‘0’ is for OFF and ‘1’ is for ON) Subcode-1 and bit-1 of CC is used to enable/disable Subcode-2. If both Subcode-1, “XX XX=1234”, and Subcode-2, “YY YY =5678” must be set as “ON”, the command must be set as “O 03 12 34 56 78”. Bit-2 of CC is used for Source Identification, ‘1’ sets the function enabled, ‘0’ sets disabled. Bit-3 of CC is used for OTA switch, ‘1’ sets OTA function enabled, ‘0’ sets disabled. Type “T 11 22 33 44 1” let “T nn1 nn2 nn3 nn4 3” be effective.
- Type “T nn1 nn2 nn3 nn4 3” to open the function of read configuration data.
- Type “R” to read and verify the programmed parameters.
- Type “T” to save the programmed parameters before exit the Capcode read/write operation.

Example

The following logging data gives an example for the Capcode data programming and read operation through the Hyper Terminal.

Tellus FLEX Pager /* This text message only will be shown while Packet format is selected.*/

J2 /*Set the operation mode as Configuration Mode.*/

T>T 11 22 33 44 1 /*Type the programming password to enable the parameter configuration.*/

T>T 12 34 56 78 2 /*Type the command to write a read password “12345678”.*/
T>F FA 5D /* Set the Frequency as 931.1625 MHz.*/

T>M 88 05 03 /* This example shows that the Transparent format is selected, message alert tone is turned on and alphanumeric paging message is to be received. */

T>B 00 12 D6 87 3 /*Set the 4th Capcode address as 1234567.*/

T> A 00 04 04 00 03 /*Set the 4th Capcode address as private message reception.*/

T>O 00 00 /* Set the header characters as “1111↵” */

T>O 01 05

T> O 02 31

T> O 03 31

T> O 04 31

T> O 05 31

T> O 06 0A

T>O 00 01 /* Set the footer characters as “22222↵” */

T>O 01 06

T> O 02 32

T> O 03 32

T> O 04 32

T> O 05 32

T> O 06 32

T> O 07 0A

T> O 0B 12 34 56 78 /* Enable OTA, Set Subcode-1 (ON) as “1234” and Subcode-2 (ON) as “5678” */

T>T 11 22 33 44 1 /*Type this command for T12 34 56 78 3 command.*/

T>T 12 34 56 78 3 /*Type this command to let R command effective.*/

T>R /*Read the configuration parameters of the Paging Data Receiver.*/
A00 00 04 04 00000005 00 /*1st Capcode address.*/
A01 00 44 04 001EA803 00 /*2nd Capcode address.*/
A02 00 44 04 001EA804 00 /*3rd Capcode address. */
A03 00 04 04 0012D687 00 /*4th Capcode address. */
FFA5D /*Frequency = 931.1625 MHz.*/
Q40 10 14 /* Unused, can be ignored.*/
S88 05 03 /*System parameter which was previously set by M88 05 03. */
Y 01 0F 71 7B 65 2F 5D 57 4F 6A 7B 63 4F 52 5A 40 21 21 21 21 /*Unused, can be ignored.*/
O 00 05 31 31 31 31 0A FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF /* Header characters */
O 01 06 32 32 32 32 32 0A FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF /* Footer characters */
O 02 0B 12 34 56 78 /* OTA and Subcode number */
T0000 /*Unused, can be ignored.*/

T>T /*Exit and save the programmed configuration parameters.*/

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