



Technical Support

TECHNICAL NOTE

Technical Note TN-836-AN

POCSAG via the TM8100 Mobile

2nd February 2004

Introduction

The TM8100 is able to support POCSAG modulation via use of an external Encoding device. The modulation from the device is tapped into the radios audio processing chain and conveyed over the air when the appropriate EPTT is activated.

The following is an example of the use of this feature:

This particular application involves using the radios inbuilt selcall and external alert facilities.

An example of where this application could be used would be any situation where vehicle operators (e.g. taxi/courier drivers) typically respond to selcall calls from a central despatcher. When away from their vehicles they would carry a POCSAG pager and therefore not miss critical calls.

Please note that the use of POCSAG modulation requires regulatory approval in some countries.

In the example above, the pager used is a LASER NUMERIC POCSAG pager. Details of this unit can be found at <http://www.atiwireless.net/>

POCSAG Paging



The POCSAG encoder was the MIDIAN ANI-MP. Unit details are available from the Midian Product catalogue. <http://www.midians.com/index.asp> look under PRODUCTS/PAGING and DIALING/POCSAG for the specification sheet and manual.

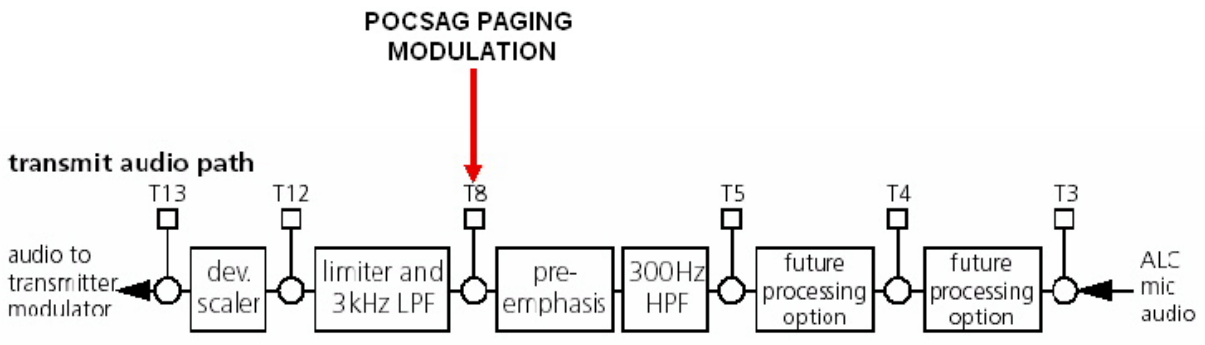
Operational Description

In the diagram above RADIO B has been configured to internally alert to a selcall call for a set period of time, and then if the call remains unanswered to activate an **EXTERNAL ALERT**.

This external alert line is connected to one of the inputs of the POCSAG Encoder.

On receipt of the input trigger from the radio, the Encoder is programmed to PTT the radio and send the POCSAG paging string to its Transmitter.

The radio is also programmed to “TAP” the incoming pocsag modulation at the appropriate point in the TX audio processing chain. (As POCSAG modulation extends from close to DC, it is necessary to bypass some of the usual “voice” filtering.)



Connection details

Fig 2 shows an example of how the Midian Encoder could be connected to the TM8100 via the Auxiliary connector. Details of the required radio programming for the Encoder are after the radio programming information.

The PCB is small enough to mount in the housing of a D RANGE plug, The plug is then connected to the back of the radio.

Alternatively, the encoder PCB could be mounted in the options area within the radio and connected to the INTERNAL OPTIONS CONNECTOR. In this instance the signals would need to be programmed to interface with this connector and not the Auxiliary one.

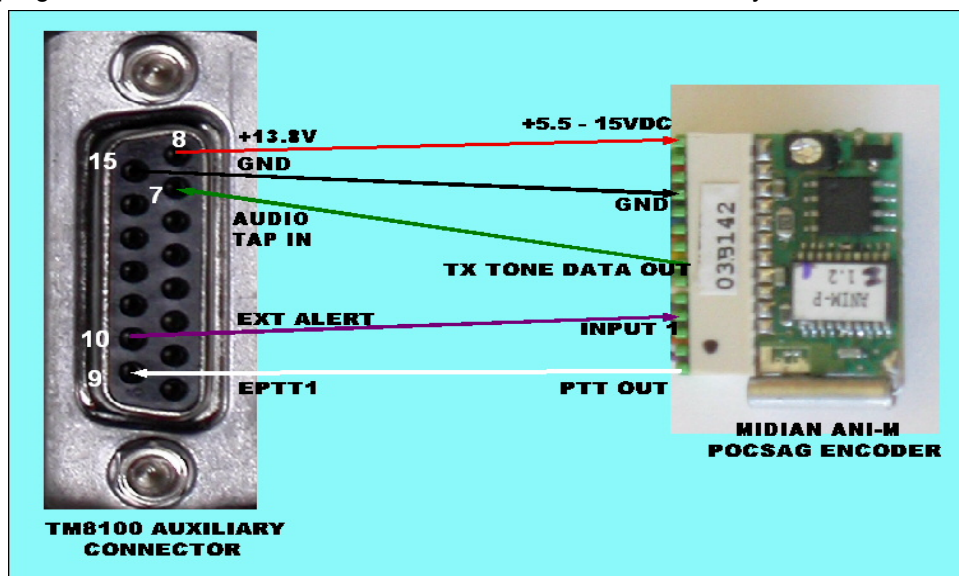


FIG 2 HARDWARE CONNECTION DETAILS

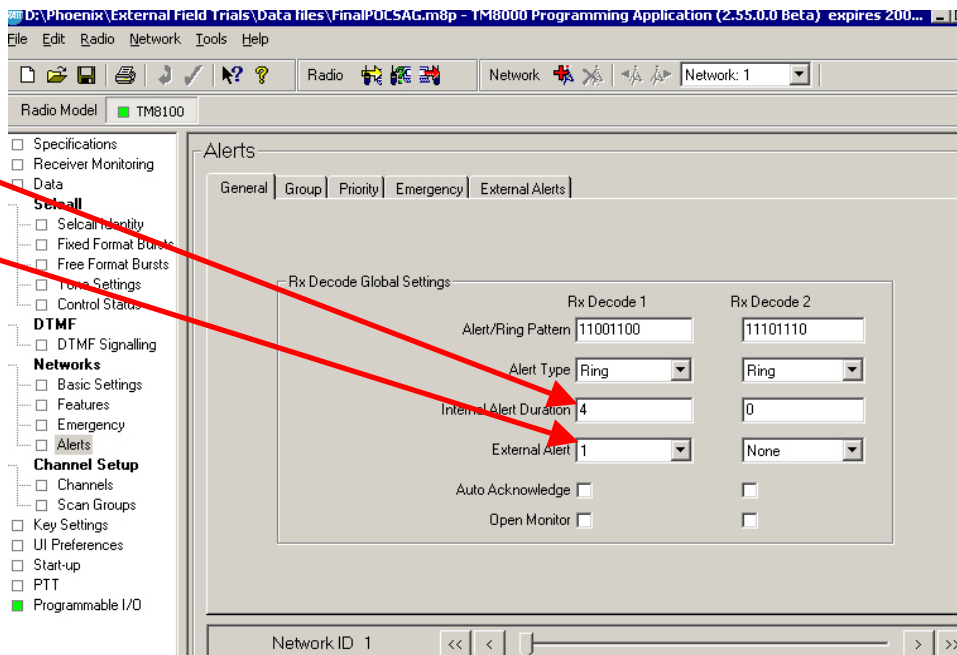
Radio Programming Details

The TM8100 needs to be configured so that its Auxiliary connector is interfaced with the POCSAG Encoder.

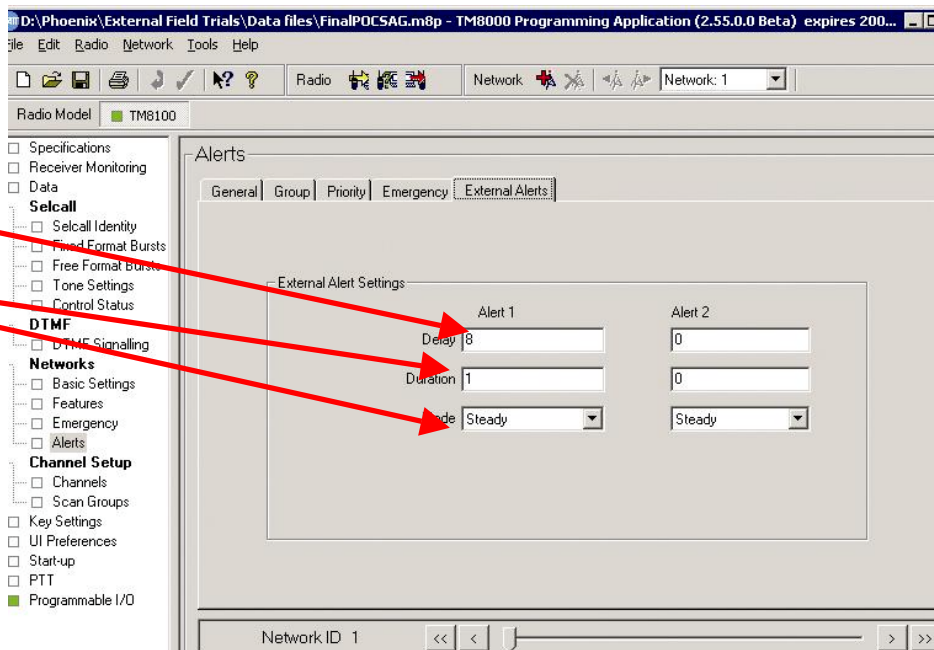
Some connections on the auxiliary connector are fixed (12V supply, GND, AUDIO TAP IN), but a programmable I/O line must be assigned for External Alert and EPTT1.

The radio needs to be configured for SELCALL.

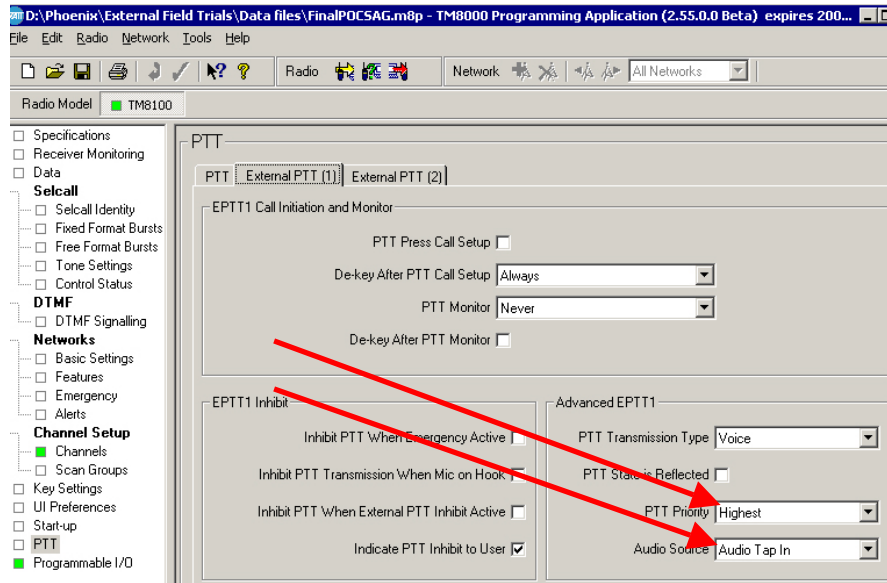
1. Under the ALERTS / GENERAL tab, the internal alert duration needs to be set to the required length and External alert needs to be enabled



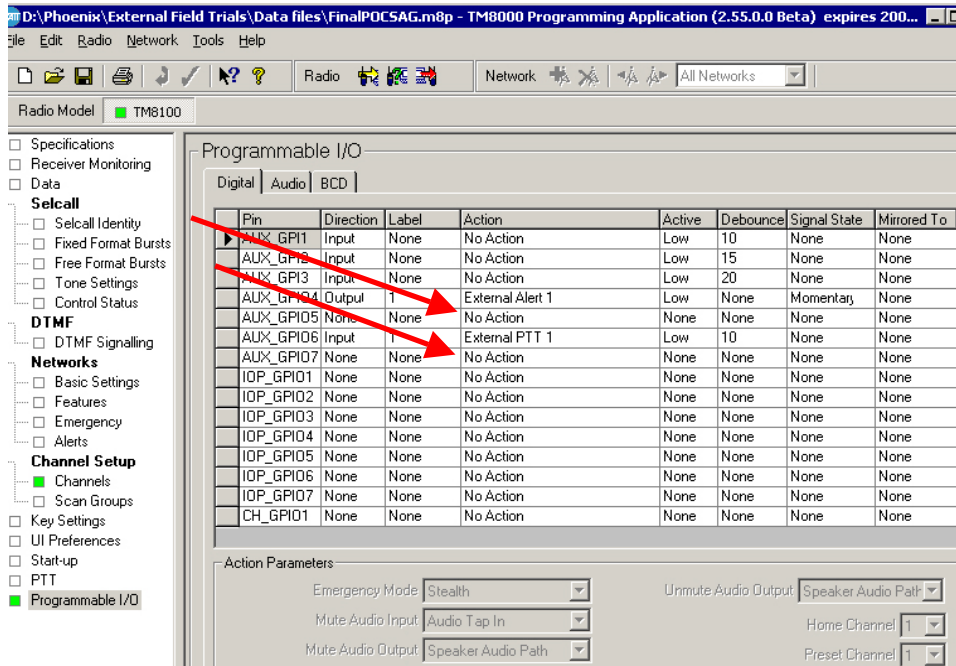
2. Under the ALERTS / EXTERNAL ALERTS tab, set the behaviour of the selected external alert. Delay before it is sent, the duration of the alert and the signal pattern to STEADY.



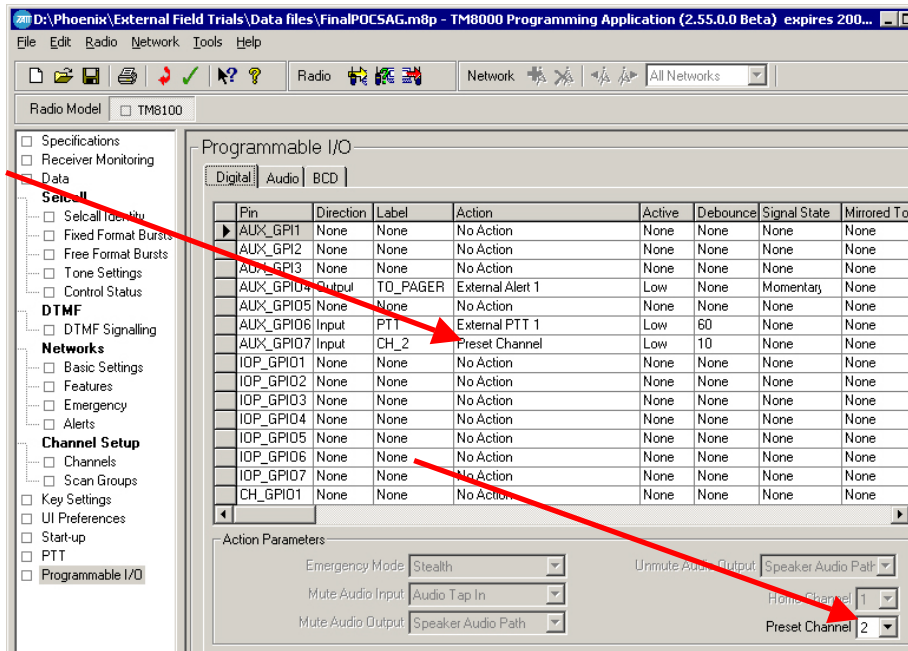
- In order to ensure that the EPTT1 takes priority, it can be set for the HIGHEST in the PTT tab. Additionally the audio source for this PTT is set for AUDIO TAP IN.



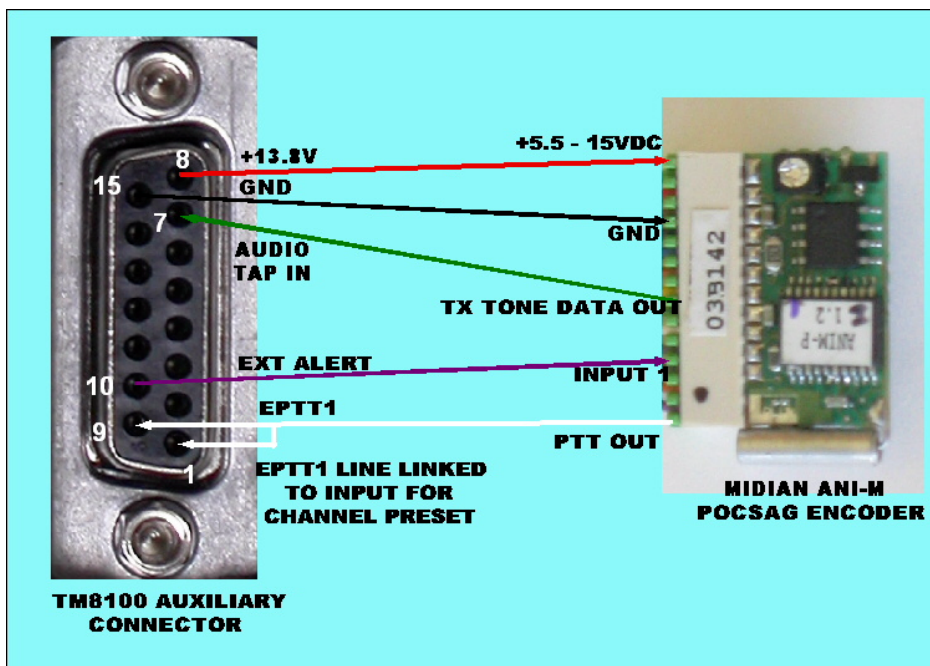
- In the PROGRAMMABLE I/O DIGITAL tab, GPIO4 has been configured as an output, which will be the External alert to the Pocsag pager module. GPIO6 has been set to an input, and is the EPTT line from the POCESAG module.
- Both are set for active low, and the PTT line has been given a debounce value of 10 mS.



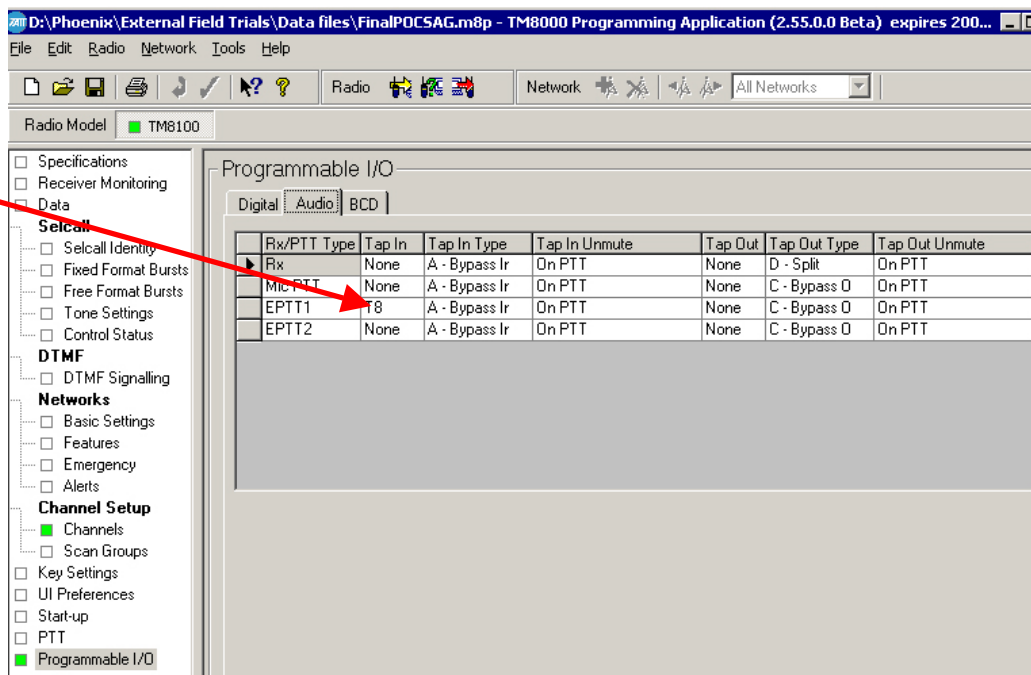
Alternatively, if you wished to initiate the POCSAG page on a different channel from the one the SELCALL call was made on: Configure another input in the programmable I/O form, and set the action for PRESET CHANNEL.



6. Make the DEBOUNCE for the EPTT input longer (60 ms in this case) and set the DEBOUNCE for the Preset channel for a shorter time (10ms in this case).
7. In this case the PRESET CHANNEL has been defined as CH2 in the bottom right corner of the PROG I/O page.
8. The PTT line from the Pager board is fed to BOTH the inputs on the connector of the radio (i.e. GPIO 6 & 7: Aux pins 9 & 1 in this example) This is shown in the connection diagram below.



9. When the PTT line from the ANI module goes LOW, after the debounce time of 10ms the radio initiates a channel change then after a further 50ms the radio initiates a PTT.
10. In the PROGRAMMABLE I/O AUDIO tab, the AUDIO TAP IN point has been configured to insert the POCSAG modulation at the appropriate point in the TX audio processing chain. As POCSAG modulation requires a response close to DC, it is important that the traditional subaudible filtering and pre-emphasis are bypassed.
11. The Tap type is set for BYPASS (The TAP IN audio replaces any other audio source – like the microphone audio).
12. The TAP IN is set to occur ON EPTT1. (We have already identified that this will be EPTT1 on the previous PTT programming tab).



The method of activation of the POCSAG encoder via an External alert line is not the only way the radio could be configured.

E.g. The radio could be programmed to activate a digital control line on receipt of its selcall identity with the correct control status digit.

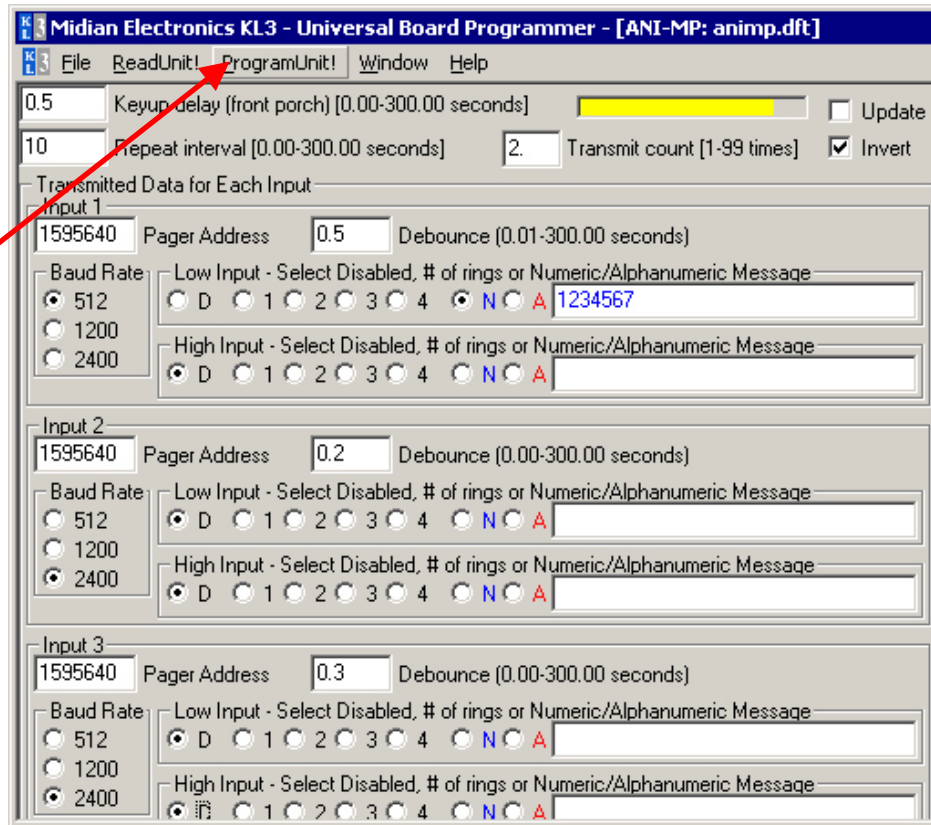
ANI Module Programming

The MIDIAN ANI module is supplied with an operation manual and programming software (KL-3) as well as the programming lead.

Please refer to this for connection to the module for programming.

To Program the module:

- Ensure you have the right **COM** port (**FILE/PREFERENCES/COM 1-4**)
- **READ** the current settings



- The programmer is divided into global settings at the top and 3 independent configurable settings for each of the available inputs (1-3)
- Below is a description of the programming features.

Global Settings

Keypup Delay: This sets the delay that can be set after the PTT signal is sent out, before the actual POCSAG modulation is sent to the radio.

Repeat Interval: If the module has been programmed to send more than one transmission of the POCSAG modulation, this is the time interval between each transmission.

Transmit Count: The module can be configured to send the POCSAG modulation from 1 – 99 times once its input has been triggered.

Invert: The POCSAG modulation polarity can be inverted if required. This is necessary for transmission to some POCSAG paging units.

Update: With this selected, the programmer will be given a visual indication (Via the Memory Use indicator to the left of the tick box) of the amount of memory buffer used.

Details of transmitted data for each input

All 3 inputs have the same fields for data input.

Pager Address : This number is used to address the required pager. Up to 7 digits can be used.

Debounce: A debounce can be programmed on the input trigger, which must go low or high for the programmed period of time before the encoder will initiate a paging call.

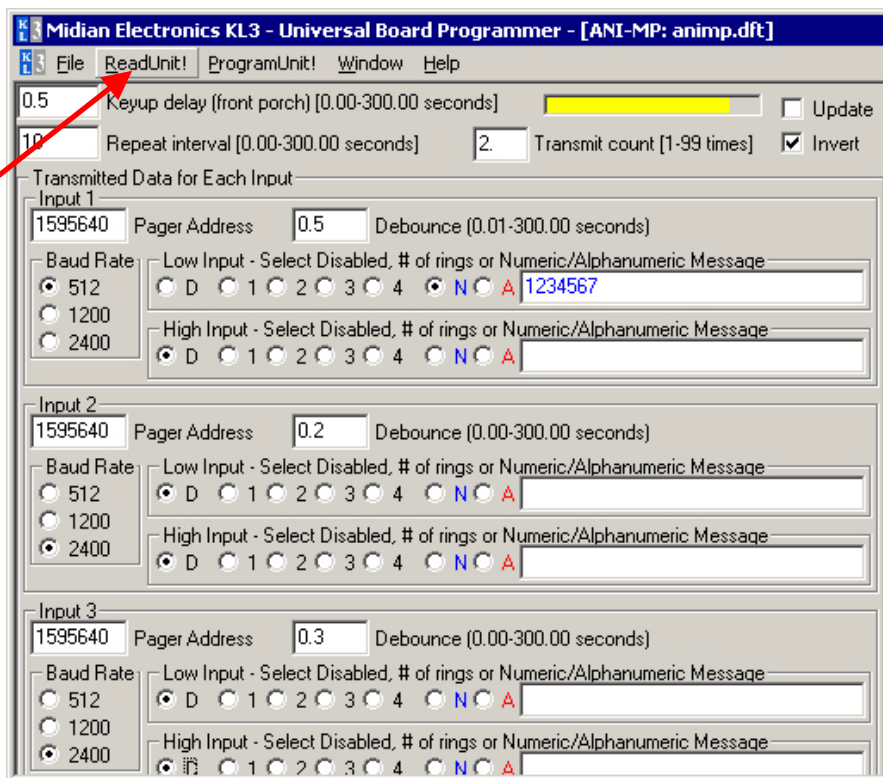
Baud Rate: The Pocsag data rate can be configured for either 512, 1200 or 2400.

Low Input: If the Input trigger is expected to be low, (Otherwise select **D** and use the HIGH INPUT below).

- A page of **1-4 rings** to be heard by a tone only pager.
- **N** for a numeric pager followed by the string of digits you want displayed by the pager.
- **A** for an alphanumeric pager followed by the characters you want displayed by the pager.

High Input: If the Input trigger is expected to be high, (Otherwise select **D** and use the LOW INPUT above).

- A ring page of 1-4 to be heard by a tone only pager.
- N for a numeric pager followed by the string of digits you want displayed by the pager.
- A for an alphanumeric pager followed by the characters you want displayed by the pager.
- To save any changed settings, **PROGRAM** the module



Additionally, the selected PAGER unit will have to be programmed to respond to the POCSAG signal as well as the radio frequency that the TM8100 is transmitting on. Instructions for this are usually supplied with the pager units, and are different depending on the manufacturer.

ANI Encoder Modulation Level

The POCSAG modulation level must not exceed 1.5KHz for Narrowband channels and 3KHz for Wideband. There is a modulation adjustment on the POCSAG encoder PCB (R12) that can be used to set this if necessary.

Compliance Issues None

CSO Instruction Please pass this information to all technical and sales staff and any interested dealer / intergrators.

3. Issuing Authority

Name and Position of Issuing Officer Christine Cant
Technical Trainer – TM8100

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