



TECHNICAL NOTE TN-1111-AN

TB7100 Repeater Operation c/w 600ohm Line Interface.

08 November 2005

Applicability

TB7100 Base Station

1. Introduction

The TB7100 offers the flexibility to operate as a talk through repeater while also providing a 600ohm balanced line interface for an external dispatcher or link repeater.

Because the base station is capable of implementing multiple PTT inputs, priority can be applied to give either the repeater operation a higher priority than the line interface, or visa versa.

This can be useful when the line dispatcher for example needs to have ultimate control over the voice communications.

2. Connections

System Interface Link Positions

System Interface Link Settings (*Position in bold font*) –

- J401 **2-3** – RX gate disconnected from internal TX key
- J400 **1-2** – TX key disconnected from internal RX gate
- J507 **1-2** – Balanced line connected to TX_MIC_AUD
- J502 **1-2** – Unbalanced line connected to AUDIO_TAP_IN
- J503 **2-3** – AUDIO_TAP_OUT connected to balanced/unbalanced outputs
- J500 **1-2** – Balanced line output set to flat response.
- J501 **1-2** – Balanced line input set to flat response.
- Remove W300 – Separate TX_AUX_GPIO5 from RX_AUX_GPIO5

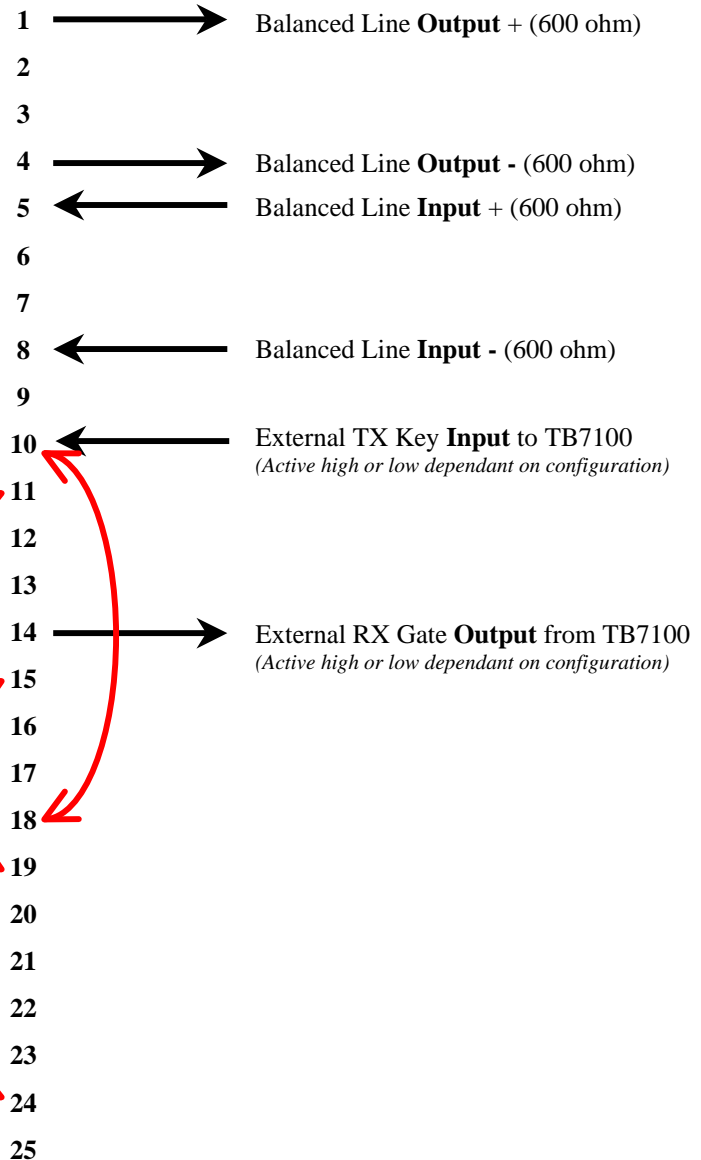
Rear DB25 connections

To implement this feature you will require 1 x DB25 male connector (*IPN - 240-00010-63*) to route I/O lines in and out of the TB7100, and also to provide I/O to the external line interfaced equipment.

On the following page there is a diagram of the necessary connections –

TB7100 Rear DB25 Connections

DB25 Pin layout
Viewed from the rear of the plug i.e solder tags / lugs.

**Explanation of DB25 links indicated by the red (curved) arrows above**

- Link Pins **15** (*TX Key*) and **19** (*RXDIG_OUT1*). Links Rx Gate to Tx Key for repeater operation.
- Link Pins **11** (*TX_AUDIO_IN*) and **24** (*RX_AUDIO_OUT*). This loops unbalanced audio for talk through operation. Adjust RV501/502 pots (unbalanced line levels) for talk through deviation. Recommend method - **RV502** is set to -10dbm out on Pin 24 of the DB25 when the receiver is presented with a signal of 60% maximum deviation. Then adjust **RV501** for 60% of maximum deviation from the transmitter once the loop between pins 11 and 24 has been made.
- Link Pins **10** (*TXDIG_OUT1*) and **18** (*RX_INHIBIT*). This activates RX inhibit when the external PTT is asserted. *Don't* fit if duplex link operation is required, such as a dispatcher. Not fitting this link will simply allow received audio to be fed to the line whenever a carrier is detected.

3. TB7100 Programming

TB7100 Receiver
TB7100 RX >
Programmable I/O >
Digital

Configure the Digital/Audio I/O to reflect the following –

Programmable I/O

Digital | Audio | BCD |

Pin	Direction	Label	Action	Active	Debounce	Signal State	Mirrored To
AUX_GPI1	Input	RT_DI_1	BCD Pin 0	Low	10	None	None
AUX_GPI2	Input	RT_DI_2	BCD Pin 1	Low	10	None	None
AUX_GPI3	Input	RT_DI_3	BCD Pin 2	Low	10	None	None
AUX_GPI4	Input	RT_DIO_1	BCD Pin 3	Low	10	None	None
AUX_GPIO5	Output	RXLINK	Busy Status	Low	None	None	None
AUX_GPIO6	None	R_DIO_2	No Action	None	None	None	None
AUX_GPIO7	Output	RXGATE	Busy Status	High	None	None	None
IOP_GPIO1	None	PIN_9	No Action	None	None	None	None
IOP_GPIO2	None	PIN_10	No Action	None	None	None	None
IOP_GPIO3	None	PIN_11	No Action	None	None	None	None
IOP_GPIO4	None	PIN_12	No Action	None	None	None	None
IOP_GPIO5	None	PIN_13	No Action	None	None	None	None
IOP_GPIO6	None	PIN_14	No Action	None	None	None	None
IOP_GPIO7	None	PIN_15	No Action	None	None	None	None
CH_GPIO1	None	C_HEAD	No Action	None	None	None	None

Action Parameters

Emergency Mode: Stealth | Unmute Audio Output: Speaker Audio Path

Mute Audio Input: Audio Tap In | Home Channel: 1

Mute Audio Output: Speaker Audio Path | Preset Channel: 1

Points of interest –

- **AUX_GPIO7** is used for the repeater operation, this should remain active high.
- **AUX_GPIO5** is used to feed the link repeater or dispatcher console. This can be set to active low or high to suit the particular application.

TB7100 RX >
Programmable I/O >
Audio

Programmable I/O

Digital | Audio | BCD |

Rx/PTT Type	Tap In	Tap In Type	Tap In Unmute	Tap Out	Tap Out Type	Tap Out Unmute
Rx	None	A - Bypass In	On PTT	R7	D - Split	Busy Detect
Mic PTT	None	A - Bypass In	On PTT	None	C - Bypass 0	On PTT
EPTT1	None	A - Bypass In	On PTT	None	C - Bypass 0	On PTT
EPTT2	None	A - Bypass In	On PTT	None	C - Bypass 0	On PTT

Points of interest –

- **R7** was chosen as the tap out point as this is positioned after the 300Hz HPF, and also provides flat audio for the line, hence the position of J500. This tap out point supplies receiver audio to both the balanced and unbalanced line outputs.

TB7100 Transmitter
TB7100 TX >
Programmable I/O >
Digital

Configure the Digital/Audio I/O to reflect the following –

Programmable I/O

Digital | Audio | BCD |

Pin	Direction	Label	Action	Active	Debounce	Signal State	Mirrored To
AUX_GPI1	Input	RT_DL_1	BCD Pin 0	Low	10	None	None
AUX_GPI2	Input	RT_DL_2	BCD Pin 1	Low	10	None	None
AUX_GPI3	Input	RT_DL_3	BCD Pin 2	Low	10	None	None
AUX_GPI04	Input	RT_DIO_1	BCD Pin 3	Low	10	None	None
AUX_GPI05	Input	LINKKEY	External PTT 2	Low	2	None	None
AUX_GPI06	None	T_DIO_2	No Action	None	None	None	None
AUX_GPI07	Input	TXKEY	External PTT 1	High	2	None	None
IOP_GPI01	None	PIN_9	No Action	None	None	None	None
IOP_GPI02	None	PIN_10	No Action	None	None	None	None
IOP_GPI03	None	PIN_11	No Action	None	None	None	None
IOP_GPI04	None	PIN_12	No Action	None	None	None	None
IOP_GPI05	None	PIN_13	No Action	None	None	None	None
IOP_GPI06	None	PIN_14	No Action	None	None	None	None
IOP_GPI07	None	PIN_15	No Action	None	None	None	None
CH_GPI01	None	C_HEAD	No Action	None	None	None	None

Action Parameters

Emergency Mode: Stealth | Unmute Audio Output: Speaker Audio Path

Mute Audio Input: Audio Tap In | Home Channel: 1

Mute Audio Output: Speaker Audio Path | Preset Channel: 1

Points of interest –

- **AUX_GPI07** is used as the TX key input for the repeater operation, this should remain active high.
- **AUX_GPI05** is used as the TX key input from the link repeater or dispatcher console. This can be set to active low or high to suit the particular application.

TB7100 TX >
Programmable I/O >
Audio

Programmable I/O

Digital | Audio | BCD |

Rx/PTT Type	Tap In	Tap In Type	Tap In Unmute	Tap Out	Tap Out Type	Tap Out Unmute
Rx	None	A - Bypass In	On PTT	None	D - Split	On PTT
Mic PTT	None	A - Bypass In	On PTT	None	C - Bypass 0	On PTT
EPTT1	T5	A - Bypass In	On PTT	None	C - Bypass 0	On PTT
EPTT2	None	A - Bypass In	On PTT	None	C - Bypass 0	On PTT

Points of interest –

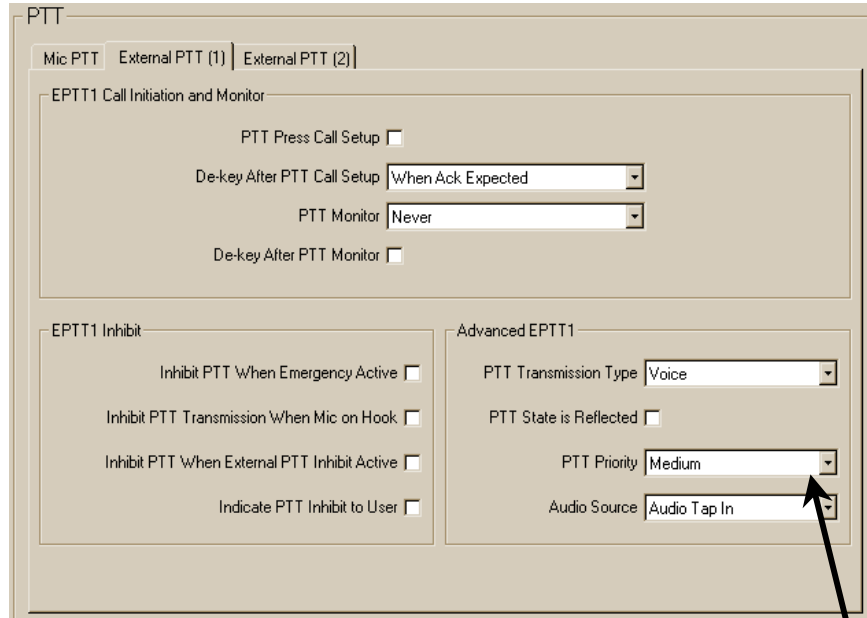
- **R5** is suggested as the tap in point for the repeater audio. This will then complement the tap out point used for the receiver audio and pre-emphasise the repeater audio before re-transmission. Audio from the link repeater or dispatcher console being feed via the balanced line audio will be supplied to the transmitter module via the AUX_MIC input, allowing these two different audio inputs to have different priorities.

PTT Priorities
TB7100 TX > PTT

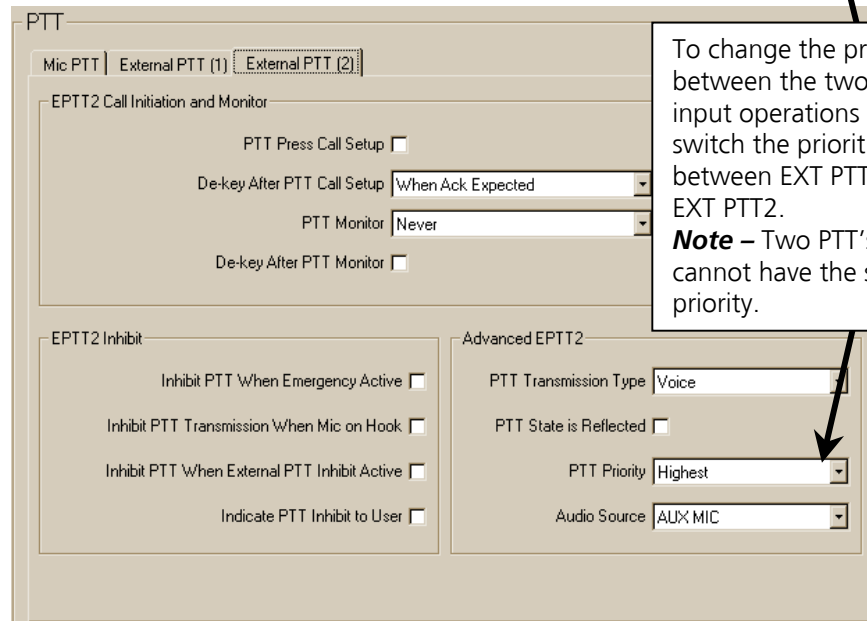
Due to the use of different audio inputs for the repeater and line operation it is possible to have different priorities for these two operations. This adds flexibility to enable the dispatcher to have control over the conversation in a dispatch operation, or the talk-through repeater to have priority in a repeater + link operation.

The Priorities are configured in the 'PTT' menu of the TB7100 programming application.

EXTERNAL PTT 1 –
Repeater PTT and
operation



EXTERNAL PTT 2 –
Dispatcher/Link
PTT and operation



To change the priorities between the two PTT input operations simply switch the priorities between EXT PTT 1 and EXT PTT2.
Note – Two PTT's cannot have the same priority.

Additional Note – Control Head PTT is set to the 'Lowest' Priority with audio source set to CH_MIC.

4. Issuing Authority

**Name and Position
of Issuing Officer**

Paul Hinton
Technical Support Engineer

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Distribution Level

Associate

Document History

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