

## Part G System Configurations

This part of the manual is divided into the sections listed below. These sections provide some brief information on basic system types and how to configure T850 Series II equipment for use in them.

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# 1 T855 Link Selectable Features

## 1.1 Flat Or De-emphasised Response

The links of PL210 and PL220 may be set to give either a flat or de-emphasised audio frequency response (refer to [Section 1.7](#) for further details).

## 1.2 Mute Relay Control

A relay with undedicated contacts (RL210) is available in the audio processor circuit block for various switching applications. A link (PL270) is available for control of the relay from the mute circuit (refer to [Section 1.7](#)). This makes the relay suitable for controlling the keying of a transmitter in repeater applications.

## 1.3 Mute Selection

Link PL250 may be set to operate with noise mute or carrier mute (refer to [Section 1.7](#)).

## 1.4 Receiver Disable

The receiver audio can be disabled by pulling the RX-DISABLE line low. When the circuit is pulled from low to high, the receiver audio cannot be re-enabled until the disable timer completes its operation. This time is variable from 15ms to 200ms by adjusting RV220 in the audio processor section.

If required, the operation of this circuit can be disabled by changing the link of PL260 from 1-2 to 2-3.

Typical applications of the receiver disable are as an extra mute for signalling purposes, or when the T855 is configured as a line controlled base station (refer to [Section 4](#)).

## 1.5 CTCSS Configuration

Links PL230 & PL240 select various CTCSS options (refer to [Section 1.7.2](#)).

## 1.6 300Hz High Pass Filter

Link PL240 also allows the insertion of this filter to improve ultimate signal-to-noise performance.

## 1.7 Audio Processor Links

The tables in this section are the same as those in [Section 3.5](#) in Part B. They have been repeated here for ease of reference.

### 1.7.1 General

Use the following table to set up the audio processor to the configuration you require. You should set the audio processor links before carrying out the receiver alignment. The factory settings are shown in brackets [ ].

Plug	Link <sup>a</sup>		Function
PL210	[1 - 2] 2 - 3	[A - B] B - C	de-emphasised response flat response
PL220	1 - 2 [2 - 3]	D - E [E - F]	flat response de-emphasised response
PL230*	1 - 2 [2 - 3] 3 - 4	M - N [N - P] P - Q	audio input via AUDIO-2 pad audio from internal CTCSS speech filter audio input via I/O pad P250
PL240 <sup>b</sup>	1 - 2 [2 - 3] or 3 - 4 4 - 5	G - H [H - J] or J - K K - L	bypass high pass filter 300Hz high pass filter in circuit audio input via PL230 or I/O pad
PL250	[1 - 2] 2 - 3	[R - S] S - T	noise mute carrier mute
PL260	1 - 2 [2 - 3]	U - V [V - W]	RX-DISABLE link not connected
PL270	[1 - 2] 2 - 3	[X - Y] Y - Z	relay link not connected

- The letters in this column and in the table in [Section 1.7.2](#) below refer to the identification letters screen printed onto the PCB beside each set of pins.
- Refer to [Section 1.7.2](#) for further details.

## 1.7.2 Audio Processor Linking Details For CTCSS

You must connect the audio processor links correctly according to the CTCSS option used, as shown in the table below.

CTCSS Option	PL230		PL240	
standard, no CTCSS	2 - 3	N - P	2 - 3	H - J
received CTCSS + speech passed to line output	3 - 4	P - Q	1 - 2	G - H
high pass filtered speech, internal CTCSS detection	2 - 3	N - P	4 - 5	K - L
external CTCSS detection	1 - 2	M - N	4 - 5	K - L

The conditions stated in the above table are defined as follows:

- standard, no CTCSS
  - no CTCSS or other sub-audio signalling used
  - audio bandwidth 300Hz to 3kHz
  - hum & noise -55dB
- received CTCSS tone + speech to line output
  - tone and speech transmitted down 600 ohm line
  - audio bandwidth 10Hz to 3kHz
  - hum & noise -45dB
- high pass filtered speech + internal CTCSS detection
  - 400Hz to 3kHz
  - hum & noise -30dB with 250.3Hz tone present
- external CTCSS detection
  - decoding performed through the receiver (but externally)
  - speech injected back into receiver via "AUDIO-2" and sent down 600 ohm line

**Note 1:** AUDIO-2 is available on D-range 1 (PL100) pin 7 via the link resistor R160. Although PL100 pin 7 is already assigned to SERIAL-COM, this can be disabled by removing R808.

**Note 2:** External CTCSS units can connect in series with the audio chain via AUDIO-1 and AUDIO-2.



## 2 T856/857 Optional Features

### 2.1 Audio Processor

The T856 and T857 come with a number of link selectable features which give added system flexibility.

**Note:** The tables in this section are the same as those in [Section 3.5](#) in Part C. They have been repeated here for ease of reference.

#### 2.1.1 Link Details

Use the following table to set up the audio processor to the configuration you require. You should set the audio processor links before carrying out any of the tuning and adjustment procedures. The factory settings are shown in brackets [ ].

Plug	Link <sup>a</sup>		Function
PL205	1-2	A	not connected
	[3-4]	B	microphone pre-amp. output to compressor input
	5-6	C	microphone pre-amp. output to multiplexer input
PL210	[1-2]	L	multiplexer output to pre-emphasis input
	3-4	M	multiplexer output to limiter input
	5-6	N	multiplexer output to compressor input
PL215	1-2	G	not connected
	[3-4]	H	compressor output to multiplexer input
	5-6	I	compressor output to limiter input
	7-8	J	compressor output to pre-emphasis input
	9-10	K	not connected
PL220	1-2	D	pre-emphasis output to multiplexer input
	[3-4]	E	pre-emphasis output to limiter input
	5-6	F	not connected

- a. The letters in this column and in the table in [Section 2.1.2](#) below refer to the identification letters screen printed onto the PCB beside each pair of pins.

## 2.1.2 Typical Options

	PL205	PL210	PL215	PL220
microphone pre-amp. compressed and pre-emphasised; line input pre-emphasised (standard set-up)	[3-4] B	[1-2] L	[3-4] H	[3-4] E
microphone pre-amp. compressed and pre-emphasised; line input unprocessed	3-4 B	3-4 M	7-8 J	1-2 D
line and microphone compressed and pre-emphasised	5-6 C	5-6 N	7-8 J	3-4 E
microphone pre-amp. compressed; line and microphone flat response	3-4 B	3-4 M	3-4 H	5-6 F

## 2.2 Line Transformer Inputs And Outputs

The line transformer (T210) is designed to provide a balanced interface to 600 ohm lines. For normal operation the two centre connections (LINE I/P 2, LINE I/P 3) are shorted together, and the 600 ohm line is connected between LINE I/P 1 and LINE I/P 4.

The secondary winding of the transformer is connected via 1k and 10 $\Omega$  (R160) resistors to pin 6 (AUDIO-2) of D-range 1 and may be used to monitor audio on the line. Pin 7 of D-range 1 can be reconfigured as AUDIO-1 by removing R808 and R160, and placing R150 (refer to [Section 2](#) in Part I for more details).

## 2.3 Opto Key

The keying circuitry may be completely isolated from the rest of the system by means of the optocoupler (IC250) connected between pins 11 and 12 of the D-range connector. A constant current source (Q270) allows keying voltages between 6 and 50V.

## 2.4 Relay Driver

A dedicated transistor (Q250) is provided for the purpose of switching an external (e.g. coaxial) relay. The output is open collector and is activated by the Tx-Reg rail. This output is available on pin 9 of the T800-03-0000 auxiliary D-range connector (D-range 2).

## 2.5 Local Microphone

Use of the local microphone (via the front panel stereo socket) will disable the audio input from the line. The audio switching occurs when the PTT switch is closed.

## 2.6 Keying With Option PCBs

If an option PCB is fitted, the exciter may be keyed via the TX-ENB-OPT pad in the audio processor. The line must be pulled low to key.

## 2.7 Transmit Key Time

(Refer to the appropriate test points & options connections drawing in Section 6 of Part C.)

A solder link (SL501) is provided on the bottom of the PCB to allow two transmit key time options, as shown in the table below.

Transmit Key Time	SL501
standard - 30ms (approx.)	not linked
short* - <5ms	linked

\*In this configuration the standby spurious emissions should be <-65dBm.



### 3 Talk Through Repeater

In this configuration the receiver directly keys the transmitter when the signal is received. The demodulated audio is fed via 600 ohm lines to the transmitter to modulate the carrier. The receiver and transmitter operate simultaneously and must therefore be on different frequencies. The minimum frequency separation depends on the duplexer used.

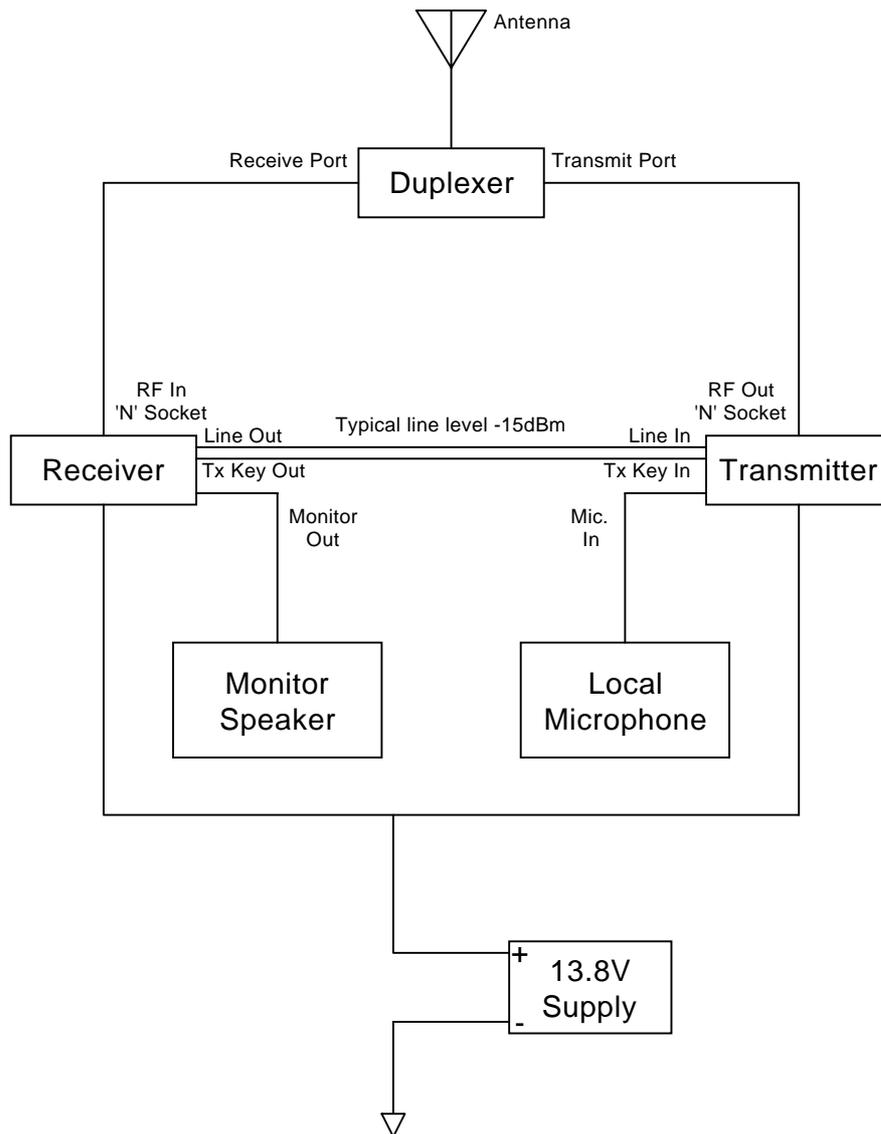


Figure 3.1 Talk Through Repeater



# 4 Line Controlled Base Without Talk Through

## 4.1 General

This installation contains a transmitter and receiver which may or may not be on the same frequency, thus simultaneous transmission and reception is not possible. When the transmitter is keyed, the coaxial relay is also energised. When the relay is in its rest position, signals from the aerial are passed to the receiver and the demodulated output is fed via 600 ohm lines to the RCU.

The receiver is disabled when the transmitter is energised to prevent the receiver mute opening from RF due to lack of isolation in the relay, direct radiation or the noise skirt of the dual frequency link.

Since the base station may be controlled via a 2-wire line and a 4-wire to 2-wire hybrid, there is a possibility of system oscillation if the receiver is not disabled during transmit. This occurs when the transmit energy enters the receiver and produces an audio response which can pass from the receive to the transmit audio part of the hybrid (impedance imbalance, etc).

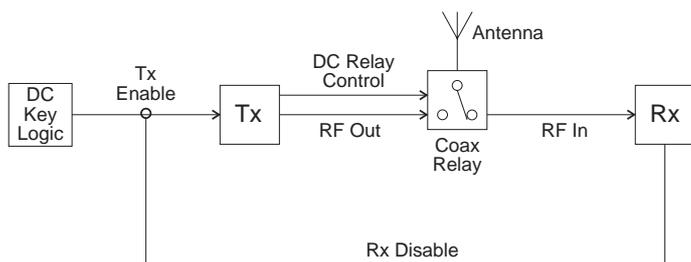


Figure 4.1 Basic Configuration

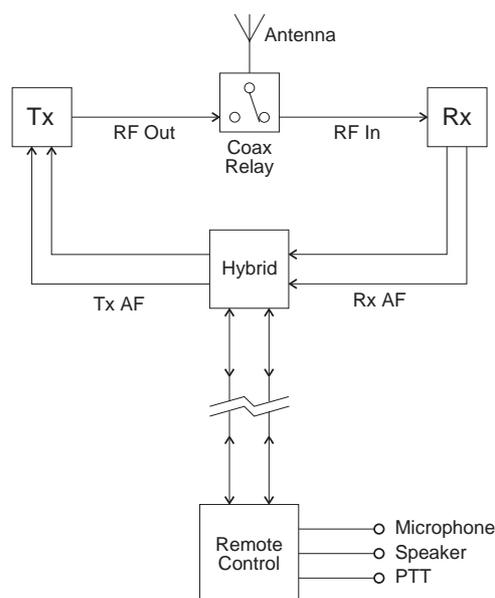


Figure 4.2 Remote Line Controlled Base Station

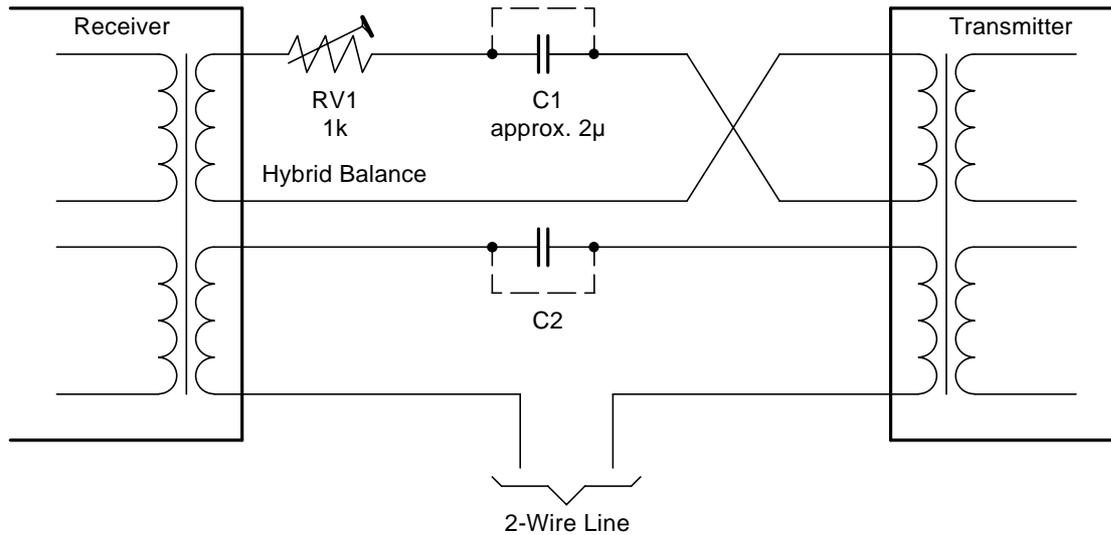


Figure 4.3 4-Wire to 2-Wire Converter

## 4.2 Transmitter Tail Timer

If the transmitter has the tail timer enabled:

- the receiver disable timer must be set so that  $t_{Rx/Dis} > t_{Tx/Tail}$ ;

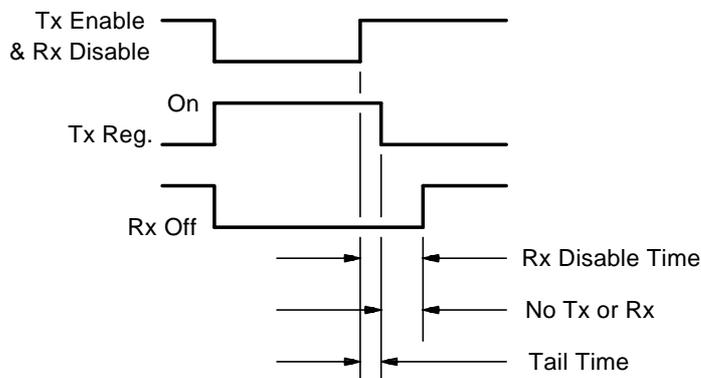


Figure 4.4 Receiver Disable Time vs Tail Time

- if the system configuration also uses an aerial changeover relay as well as the tail timer, the changeover relay must be driven from the relay driver (Q250) in the audio processor, rather than by Tx-Key or Tx-Enable; this output is available on pin 9 of the T800-03-000 auxiliary D-range (D-range 2);
- depending on tail time requirements, it is possible for the transmitter tail time to exceed the receiver disable time capability; in this situation the receiver disable line should also be driven from relay driver Q250 (D-range 2 pin 9).