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Colin Hinson
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BR8685(1)(2)(3)(4)(5)(6)

Handbook for
TERMINAL TELEGRAPH

NSN 5805-99-539-1968/9

By Command of the Defence Council

AUGUST 1980

Frank Cooper.

MINISTRY OF DEFENCE
DIRECTOR GENERAL WEAPONS (NAVAL)

TERMINAL TELEGRAPH (T) MEL 3513 172 1884

NSN 5805-99-539-1968

AND

TERMINAL TELEGRAPH (B) MEL 3513 172 1885

NSN 5805-99-539-1969

CONTENTS

TP18361C

WARNING

THIS EQUIPMENT CONTAINS THE FOLLOWING HAZARDS TO PERSONNEL

WARNING

EHT. RISK OF ELECTRIC SHOCK. THE EHT SUPPLIES TO SOME UNITS IS POTENTIALLY LETHAL.

WARNING

WET TANTALUM CAPACITORS ARE USED IN THE EQUIPMENT THE ELECTROLYTE IS CORROSIVE.

WARNING

HOT SURFACES	ANTI-CONDENSATION HEATERS BECOME DANGEROUSLY HOT WHEN THE EQUIPMENT IS IN THE ON/PRESERVED STATE.
HOT SURFACES	SUB-ASSEMBLIES BECOME DANGEROUSLY HOT DURING NORMAL OPERATION.

FURTHER INFORMATION ON HAZARDS IS GIVEN IN BR 2000(20)

WARNING

THIS EQUIPMENT CONTAINS THE FOLLOWING HAZARDS TO PERSONNEL

WARNING

BERYLLIUM OXIDE. SOME COMPONENTS ARE MADE FROM OR CONTAIN BERYLLIUM OXIDE. THIS MATERIAL IS HAZARDOUS.

(i) IF THE DUST IS INHALED

(ii) IF THE MATERIAL IS ABSORBED INTO THE BODY TISSUE THROUGH THE SKIN, MOUTH OR WOUND

(iii) TOXIC FUMES ARE INHALED FROM A FIRE, INVOLVING BERYLLIUM/BERYLLIA COMPONENTS

WARNING

CADMIUM. SOME PARTS OF THIS EQUIPMENT CONTAIN CADMIUM PLATED PIECE PARTS. CADMIUM OXIDE IS HAZARDOUS.

(i) IF THE WHITE DUST IS INHALED

(ii) IF THE MATERIAL IS INGESTED

(iii) IF THE FUMES PRODUCED BY WELDING, SOLDERING OR BRAZING ARE INHALED.

WARNING

HIGH VOLTAGES. RISK OF ELECTRIC SHOCK. THE 115V 60HZ INTERNAL SUPPLIES TO THIS EQUIPMENT ARE POTENTIALLY LETHAL.

FURTHER INFORMATION ON HAZARDS IS GIVEN IN BR 2000(20)

CAUTION

THIS EQUIPMENT CONTAINS THE FOLLOWING WARNING TO PERSONNEL

CAUTION

ALL PANEL ELECTRONIC CIRCUITS (PECS) AND SIMILAR ELECTRONIC ASSEMBLIES ARE TO BE CONSIDERED TO BE SENSITIVE TO ELECTROSTATIC DISCHARGE DAMAGE. CORRECT PROCEDURES ARE TO BE FOLLOWED.

FURTHER INFORMATION ON HAZARDS IS GIVEN IN BR 2000(20)

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SUMMARY OF DATA

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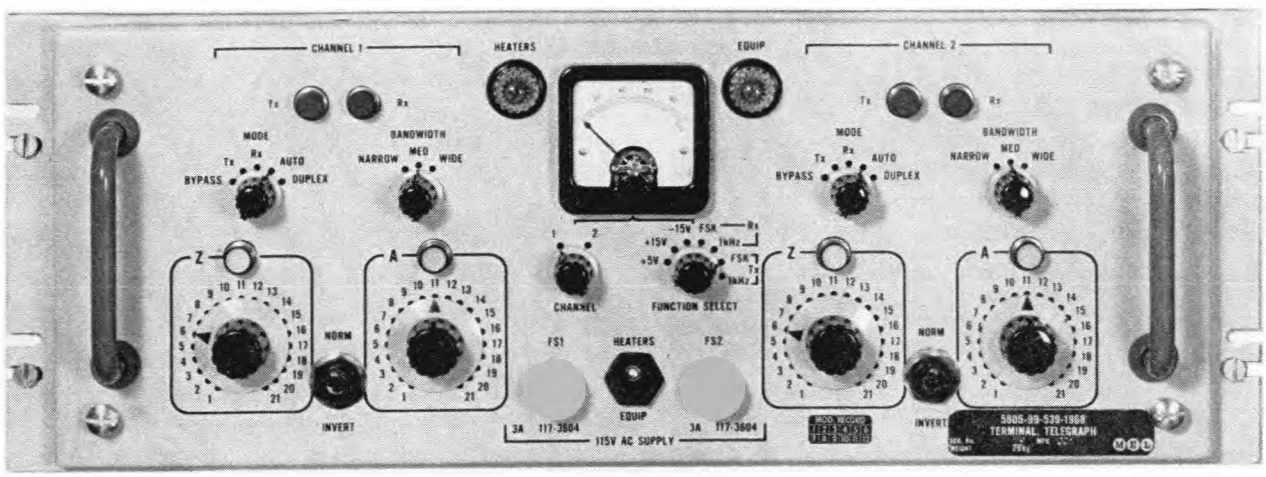

FIG. 1.1 TERMINAL TELEGRAPH (T)

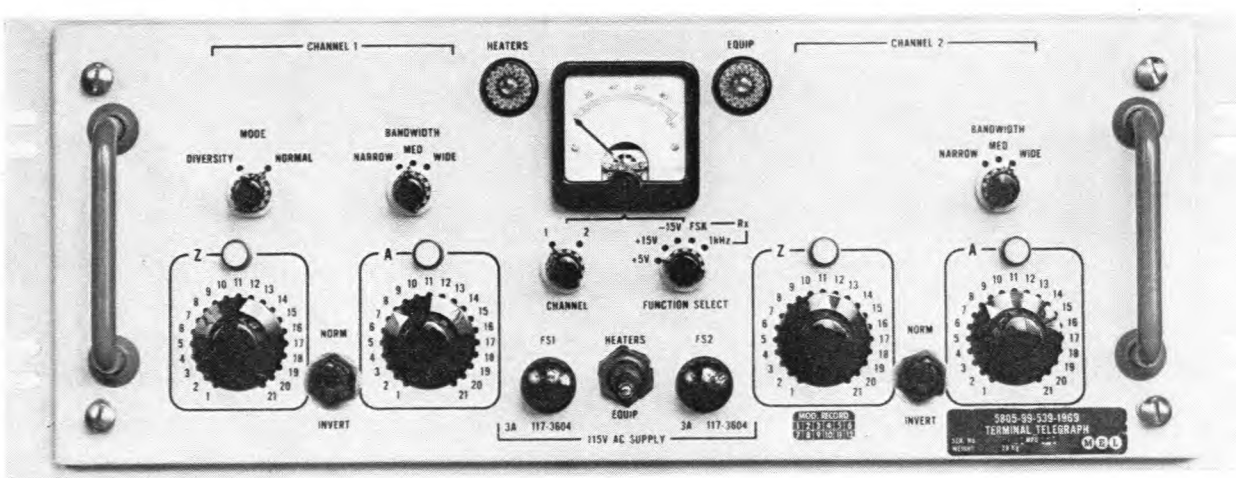

FIG. 1.2 TERMINAL TELEGRAPH (B)

PART 1

SUMMARY OF DATA

INTRODUCTION

1. The Terminal Telegraph provides signal conversion from two-tone frequency-shift-keying (FSK) into a 1kHz ON/OFF tone and vice versa for radio teletype working. Signal conversion is carried out in modulator/demodulator assemblies (modems). Terminal Telegraph (T) (Figure 1.1) MEL 3513-172-1884, NSN 5805-99-539-1968, contains two independent transmit-receive (Tactical) modems, and Terminal Telegraph (B) (Figure 1.2), MEL 3515-172-1885, NSN 5805-99-539-1969, contains two receive-only (Broadcast) modems.

BRIEF DESCRIPTION

2. There are two basic modes of operation:

(a) Transmission Mode. Signals are applied to a modem as 1kHz ON/OFF tones and are converted in the modulator section of the modem into a two-tone, phase-continuous, voice frequency form. The required A and Z tones are selected by the A and Z switches on the front panel of the Terminal Telegraph. These switches determine tones for both received and transmitted signals.

(b) Receive Mode. The incoming two-tone FSK signal is applied to a pair of mixers which produce complementary signals representing the original A and Z tone components of the incoming signal. These signals are then combined and used to modulate the 1kHz tone output.

MAJOR UNITS

3. The following major units are included in the equipments:

NATO No	Title	Type (T)	Type (B)
5805-99-539-1970	Filter, radio interference	1	1
5805-99-539-1971	Filter, radio interference	1	1
5805-99-537-0863	Translator, signal data	2	2
5915-99-527-8232	Filter, bandpass (wide shift)	2	2
5915-99-527-8233	Filter, bandpass (narrow shift)	2	2
5805-99-537-0864	Demodulator-Assessor	2	2
5805-99-527-8235	Electronic switch	2	2
5805-99-537-0866	Modulator, voice frequency	2	-
5805-99-529-9548	Power supply	1	1
	Case, Terminal Telegraph	1	1

PERFORMANCE CHARACTERISTICS

4.(a) RATT traffic (Tactical transmit mode)

(i) Single-channel traffic at 50/75/110 bauds: sub-carrier 500 ±1Hz and 700 ±1Hz.

(ii) Single-channel traffic at 50/75/110 bauds:
sub-carrier frequency selected from the series (255 + 170n) Hz, where n is 1-16. Frequency generation accuracy ±1Hz.

(iii) Single-channel traffic at 50/75/110 bauds:
sub-carrier 1572.5 ±1Hz and 2422.5 ±1Hz.

(iv) Single-channel traffic at 50/75/110 bauds:
centre frequency selected from the series (255 +170n) Hz, where n is 1-16 ±42.5Hz deviation. Frequency generator accuracy ±1 Hz.

(b) RATT traffic acceptance (Tactical receive mode and Broadcast mode)

(i) Single-channel traffic at 50/75/110 bauds:
centre frequency 1kHz with deviation ±42.5Hz.

(ii) Single-channel traffic at 50/75/110 bauds:
centre frequency 600Hz with deviation ±100Hz.

(iii) Single-channel traffic at 50/75/110 bauds:
sub-carrier frequency selected from the series (255 + 170n) Hz, where n is 1-16.

(iv) Single-channel traffic at 50/75/110 bauds:
sub-carrier frequency selected from the series (255 + 170n) Hz, where n is 1-16, and when all 16 sub-carriers may be present (multi-channel broadcast).

(v) Single-channel traffic at 50/75/110 bauds:
centre frequency 2kHz with deviation ±425Hz.

(vi) Single-channel traffic at 50/75/110 bauds:
centre frequency selected from the series (255 + 170n) Hz, where n is 1-16 with deviation ±42.5Hz.

(c) RATT traffic acceptance (Broadcast modem only)

(i) Diversity - Single channel traffic (as defined in b) in channel 2 is combined with single channel traffic in channel 1 to give a single teleprinter output from channel 1.

ELECTRICAL CHARACTERISTICS

5.(a) Audio Input signal levels and Output signal levels: 0dBm nominal.

(b) Audio Input impedance: 600ohms ±10%.

(c) Audio Output impedance: 25ohms ±5ohms.

(d) Input from teleprinter: 1kHz ON/OFF tone at 0dBm.

(e) Output to teleprinter: 1kHz ON/OFF tone at 0dBm.

PHYSICAL DATA

6. Rack-mounted case.

Height	0178m
Width	0.488m
Depth	0.647m
Weight	29.0 Kg

POWER REQUIREMENTS

7. 115V, 47-63Hz, 66W.

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AND OPERATING INSTRUCTIONS

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CHAPTER 1

GENERAL DESCRIPTION

INTRODUCTION

1. Two types of Terminal Telegraph equipment are described in this handbook.

(a) Terminal Telegraph (T), 5805-99-539-1968. Provides both receive and transmit facilities. Signal conversion is carried out in modems (modulator - demodulator assemblies). Receive signals are converted from a 2-tone, voice frequency form into a 1kHz ON/OFF tone. Signals for transmission are converted from 1kHz ON/OFF tone into 2-tone, phase continuous, voice-frequency signals.

(b) Terminal Telegraph (B), 5805-99-539-1969. Provides a receive facility only.

DESCRIPTION

2.(a) Terminal Telegraph (T), NSN 5805-99-539-1968. Contains two tactical modems identical in operation. They are completely independent of each other but share common internal power supply and metering facilities. The metering facilities provide for measurement of power supply levels and levels for FSK (two-tone, voice frequency) and 1kHz (teleprinter) signals (Figure 1.1).

(b) Terminal Telegraph (B), 5805-99-539-1969. Contains two broadcast modems identical in operation. They are completely independent of each other but, like the (T) modem, share common internal power supply and metering facilities.

TACTICAL MODEM OPERATION

Figure 1.2

3. Each tactical modem can be operated in any of 5 modes, selected by means of a mode switch on the front panel of the equipment:

(a) Bypass Mode. The 1kHz ON/OFF input signal to the transmit modem bypasses the modem and is applied directly to the transmit output.

(b) Tx Mode. Signals for transmission are passed via the modem and the received signal output gate is closed. In the absence of traffic, the Z tone is transmitted continuously.

(c) Rx Mode. Any received signal of the correct frequency is processed within the modem. Continuous noise will simply mute the receiver. Output to the transmission channels is inhibited.

(d) Auto Mode. The modem remains in a standby state until input conditions determine whether it adopts a receive or a transmit mode. Assuming, initially, that the modem is in the standby state, ie that there is no received signal registered and that there has been no transmission for at least 3 seconds, then if signals other than mere noise are received at the input, the received signals output gate is opened and output to the transmission circuits is inhibited. As soon as the received signals cease, the modem reverts to the standby state. If transmission is commenced, the path to the transmission circuits is opened and the closed. This state

is maintained until 3 seconds after the last signal registered at the transmitter input to the modem. The modem then reverts to the standby state.

(e) Duplex Mode. Both the received signal output gate and the transmission path are open allowing both received and transmitted signals to be routed simultaneously through the Terminal Telegraph.

4. Received signals in 2-tone, voice frequency form are applied to a demodulator which operates as follows (see Figure 1.2). The incoming signals are fed to a pair of mixers (one A-tone and one for Z-tone). The mixer outputs are fed via band-pass filters to a pair of detectors which provide suitable A-tone and Z-tone signals. The band-pass filters are provided to to allow for discrimination of incoming signals according to the reception conditions; three values of discrimination are provided, Wide, Medium and Narrow, corresponding to pass-bands of 510, 170 and 85Hz respectively. The Narrow pass-band is selected only in particular circumstances (see Table 2.1) and in these circumstances a double mixing system is in operation (Figure 1.3). The A-tone and Z-tone signals from the demodulators are combined in the Received Signal Assessor and applied to the Received Signal Output Gate.

5. The Received Signal Output Gate is opened by the Rx Gate control only if the following conditions are fulfilled:

(a) A valid signal (not noise) is available from the signal assessor: this condition is derived from the Muting Control;

(b) The incoming signal is of adequate level: this condition is derived from the Level Detector.

(c) Either the Mode switch is in the Rx position or, if the switch is in the Auto position, no transmission is taking place currently (ie no Rx Inhibit signal from the Modulator Gate).

6. Either the normal or inverted form of the demodulated signal is available from the Output Gate and is applied via a Logic to 1kHz Tone Converter to the output of the modem.

7. Signals for transmission are applied to the Modulator Gate via a tone to logic circuit. The corresponding output from the Modulator is available provided that no Tx inhibit signal is present from the Tx-Rx control (eg in Rx or Auto Modes). The Modulator then provides a Rx Inhibit signal to close the Received Signal Output Gate; in the Auto mode, the gate remains closed for 3 seconds after the last registered signal at the input to the Modulator.

BROADCAST MODEM OPERATION Figure 1.4

8. Each broadcast modem can be operated in one of two modes, selected by means of a mode switch on the front panel of the equipment:

(a) Normal Mode. When normal mode is selected each channel operates independently in a similar manner to that of the demodulator section in the tactical modem.

(b) Diversity Mode. When diversity mode is selected, output from the channel 2 demodulator is summed with the channel 1 demodulated signal in the channel 1 assessor. The resultant common output logic levels from channel 1 assessor are applied via a Logic Tone Converter to the output of the channel 1 modem.

ANTI-CONDENSATION HEATERS

9. Anti-condensation heaters are fitted in the equipment. When the HEATERS/EQPT switch is set to HEATERS, the equipment is switched off and the anti-condensation heaters are switched on. When the switch is set to EQPT, the anti-condensation heaters are switched off and the equipment is switched on.

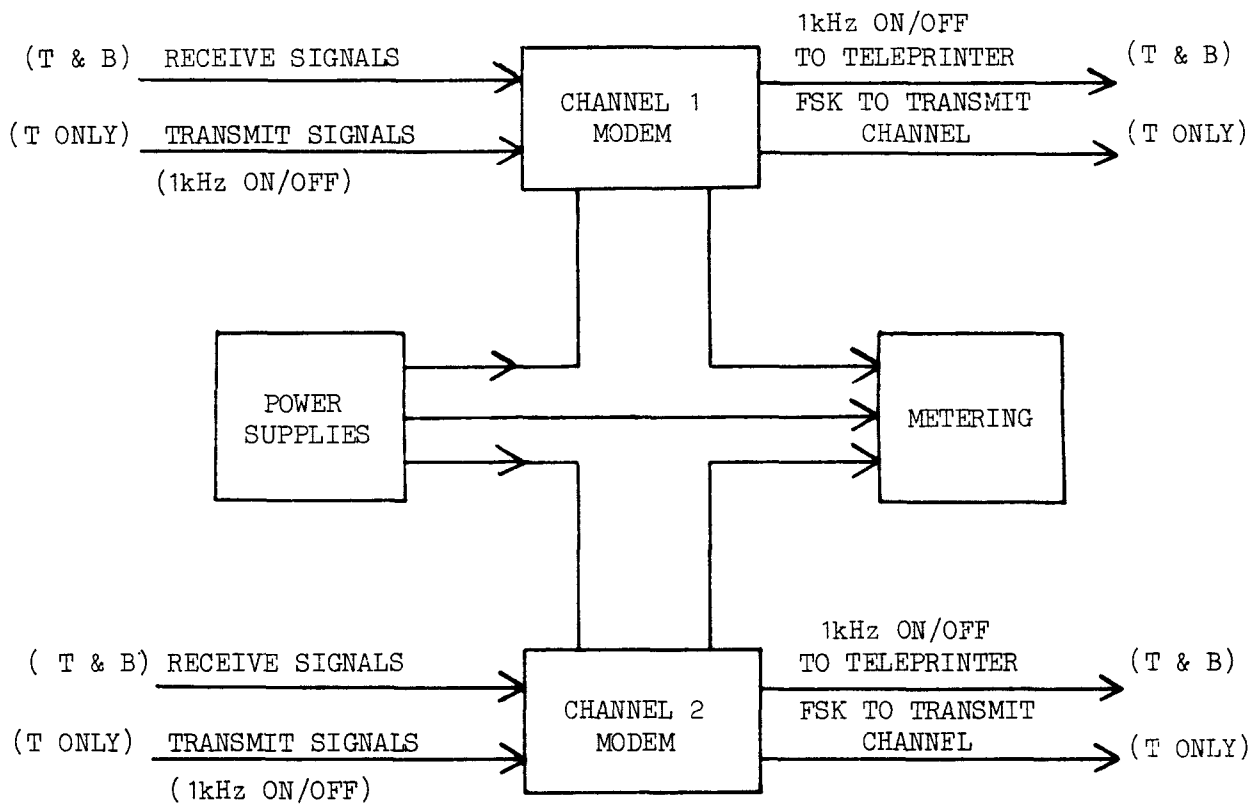

FIG.1.1 BASIC ARRANGEMENT OF POWER SUPPLIES AND METERING

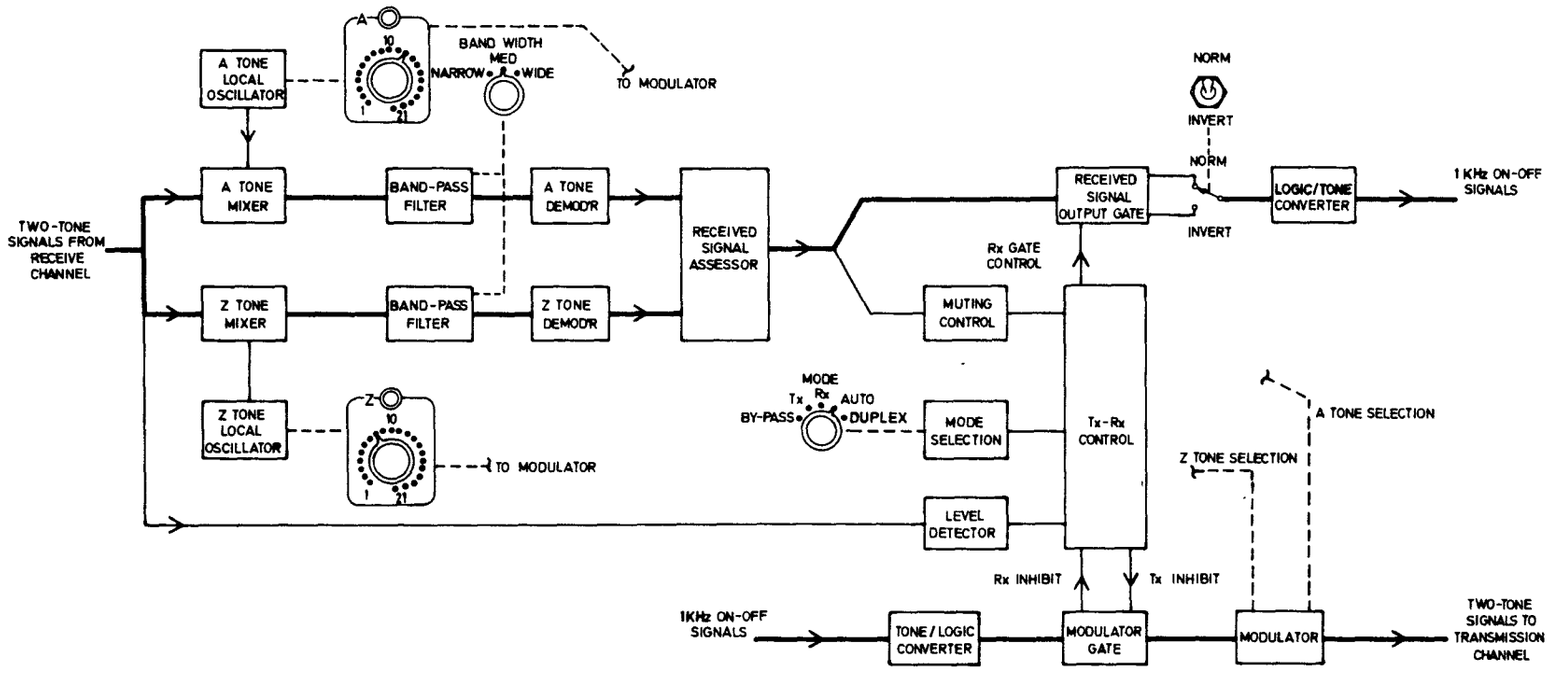

FIG 1.2 TACTICAL MODEM (RECEIVE/TRANSMIT)

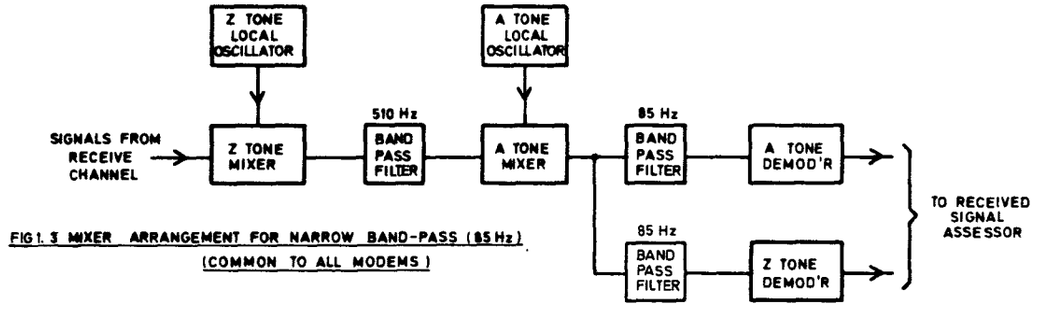

FIG 1.3 MIXER ARRANGEMENT FOR NARROW BAND-PASS (85 Hz)
(COMMON TO ALL MODEMS)

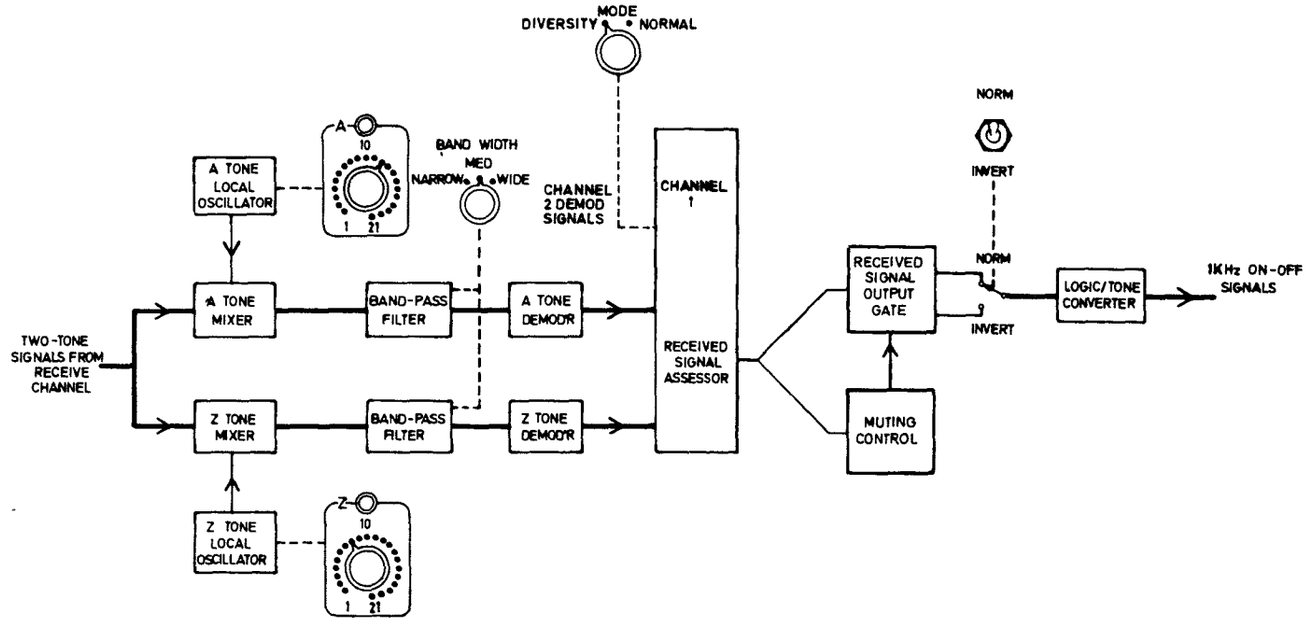

FIG 1.4 BROADCAST MODEM (RECEIVE ONLY)

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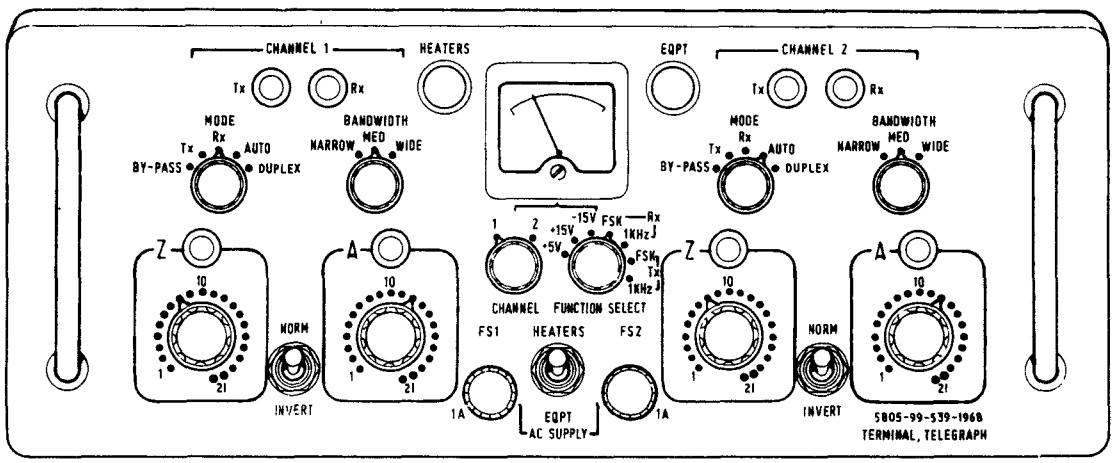

FIG. 2.1 TERMINAL TELEGRAPH (T)

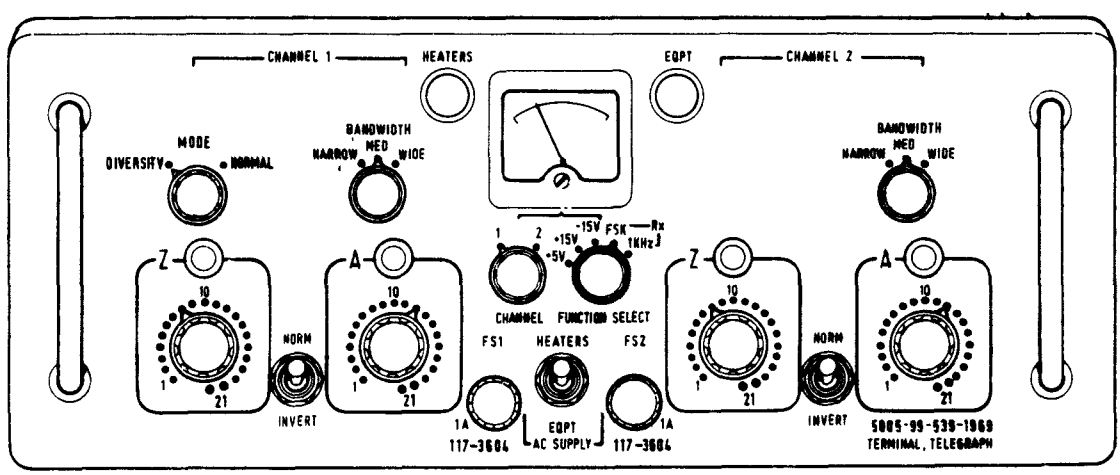

FIG. 2.2 TERMINAL TELEGRAPH (B)

PART 2

CHAPTER 2

OPERATING INSTRUCTIONS

INTRODUCTION

1. The equipment can be operated in any of the available modes as desired. The following instructions represent only generalised procedure which can be adapted according to requirements.

TABLE 2.1 OPERATION OF TERMINAL TELEGRAPH (T)

Event	Action	Remarks
1.	To switch on equipment, set HEATERS/EQPT switch to EQPT.	EQPT indicator lamp illuminated. HEATERS indicator lamp extinguished.
2.	Set CHANNEL switch to 1 or 2 as appropriate.	To select channel to be monitored.
3.	Set FUNCTION SELECT switch to +5V, +15V and -15V in turn.	Meter indication 50 ±2 divisions.
4.	Set A and Z switches for selected channel to select required frequencies.	See Table 2.3.
5.	Set MODE switch of selected channel to Rx DUPLEX or AUTO as required.	In presence of incoming received signals, or of noise, Rx indicator lamp flashes or is illuminated continuously, according to composition of incoming signals on AUTO; illuminated continuously on Rx.
6.	Set NORM/INVERT switch to NORM or INVERT as required.	Usually set to NORM.
7.	Set BANDWIDTH switch of the selected channel to NARROW, MED or WIDE, as required	Normally set to MED. NARROW setting used only when A switch set to 21.
8.	To check incoming signal levels in Rx, AUTO or DUPLEX modes, set FUNCTION SELECT switch to FSK-Rx.	Meter indication: No signal : 20 Signal present (0dBm) : 80

(Contd)

Event	Action	Remarks
9.	To check output signal level in Rx or AUTO modes, set FUNCTION SELECT switch to 1kHz-Rx.	Meter indication No signal : 20 (STEADY MARK) Signal present : 80 (STEADY SPACE) (0dBm)
10.	To check incoming transmission levels in Tx and AUTO modes, set FUNCTION SELECT switch to 1kHz-Tx.	Meter Indication No signal/Mark : 20 (STEADY MARK) Signal/Space : 80 (STEADY SPACE) (0dBm)
11.	To check outgoing transmission levels in Tx DUPLEX and AUTO modes, set FUNCTION SELECT switch to FSK-Tx.	Meter indication No signal : 20 Signal Present : 80 (0dBm)
12.	To switch off equipment set HEATERS/EQPT switch to HEATERS.	HEATERS indicator lamp illuminated. EQPT indicator lamp extinguished.

TABLE 2.2 OPERATION OF TERMINAL TELEGRAPH (B)

Event	Action	Remarks
1.	To switch on equipment, set HEATERS/EQPT switch to EQPT.	EQPT indicator lamp illuminated. HEATERS indicator lamp extinguished.
2.	Set CHANNEL switch to 1 or 2 as appropriate.	To select channel to be monitored.
3.	Set FUNCTION SELECT switch to +5V, +15V and -15V in turn.	Meter indication 50 ±2 divisions.
4.	Set A and Z switches of selected channel to select required frequencies.	See Table 2.3
5.	Set NORM/INVERT switch to NORM or INVERT, as required.	Usually set to NORM.
6.	Set MODE switch to NORMAL or DIVERSITY.	In DIVERSITY mode the combined output is available from CHANNEL 1.
7.	Set BANDWIDTH switch of the selected channel to NARROW, MED or WIDE, as required.	Normally set to MED. NARROW setting used only when A switch is set to 21.

(Contd)

Event	Action	Remarks
8.	To check incoming signal levels, set FUNCTION SELECT switch to FSK-Rx	Meter indication No signal : 20 Signal Present : 80 (0dBm)
9.	To check outgoing signal levels, set FUNCTION SELECT switch to 1kHz-Rx.	Meter indication No signal : 20 (STEADY MARK) Signal present : 80 (STEADY SPACE) (0dBm)
10.	To switch off equipment, set HEATERS/EQPT switch to HEATERS	HEATERS indicator lamp illuminated. EQPT indicator lamp extingished

TABLE 2.3 A AND Z SWITCHES : FREQUENCY SETTINGS

A or Z Switch Setting	Frequency Hz	Notes
1	425	Any A setting from 1 to 16 can be used with any Z setting from 1 to 16, as required, provided that A and Z settings are different (Bandwidth switch set to MED for normal operation. WIDE may be used for circuits with good readability and with channel spacing greater than 510Hz.
2	595	
3	765	
4	935	
5	1105	
6	1275	
7	1445	
8	1615	
9	1785	
10	1955	
11	2125	With A set to 21, any Z setting from 1 to 16 can be used for: A = (255 + 170n) n = 1-16, +42.5Hz Z = (255 + 170n) n = 1-16, -42.5Hz (Bandwidth switch must be set to NARROW).
12	2295	
13	2465	
14	2635	
15	2805	
16	2975	
17	500	Only valid combinations are 17 with 18 (A = 500, Z = 700) and 18 with 17 (A = 700, Z = 500) - (Bandwidth switch set to MED)
18	700	
19	1575	19 with 20 (A = 1575, Z = 2425) (Bandwidth switch set
20	2425	20 with 19 (A = 2425, Z = 1575) to MED or WIDE)
		RECEIVE ONLY
21	1042.5 957.5	Both switches set to 21 for A = 1042.5, Z = 957.5 (BANDWIDTH switch must be set to NARROW)

TABLE 2.4 CONTROLS AND INDICATORS (TERMINAL TELEGRAPH 'T')

Control or Indicator	Description
HEATERS/ EQPT	Switches a.c. supply either to the equipment or to the internal anti-condensation heaters.
HEATERS	Indicator illuminated when HEATERS/EQPT switch set to HEATERS.
EQPT	Indicator illuminated when HEATERS/EQPT switch set to EQPT.
Fuses	3A fuses fitted in main a.c. supply.
NORM/ INVERT	Provides an inverted output from receive section of modem.
A (21 Positions)	Selects required A-Tone frequency for incoming and outgoing signals (see Table 2.3) Indicator lamp flashes when A-channel traffic greater than -16 dBm is present: can therefore be lit or out continuously, depending on composition of signals.
Z (21 Positions)	Selects required Z-Tone frequency for incoming and outgoing signals (see Table 2.3). Indicator operates in similar fashion to that of A indicator in the presence of traffic.
BANDWIDTH (3 Positions)	Selects bandwidth (NARROW, MEDIUM, WIDE) according to requirements for incoming signals. NOTE · The NARROW position must be selected only when A = 21 is selected on the A selection switch (see Table 2.3).
MODE (5 Positions) BY-PASS Tx Rx AUTO DUPLEX	Tactical Modems only. Selects mode of operation of modem. Input to transmit section by-passes the modem and is connected directly to the transmit output. Sets modem for transmission only: receive path inhibited. Sets modem for reception only: transmit path inhibited. Sets modem for reception or transmission automatically according to circumstances. Transmit and Receive paths open independently and simultaneously.
CHANNEL (2 Positions)	Selects Channel 1 or 2 for monitoring by FUNCTION SELECT meter switch.

(Contd)

Control or Indicator	Description
FUNCTION SELECT	Meter switch for monitoring selected parameter; number of positions varies according to type of modem. Used in conjunction with panel meter.
+5V +15V -15V	In any of these positions, correct voltage indication shown as 50 on meter scale (±2 division).
FSK-Rx	Scale indication lies between 20 and 80 according to incoming signal level. 0dBm = 80.
1kHz-Rx	Correct scale indication is 20 for MARK condition, 80 for SPACE condition. 0dBm = 80.
FSK-Tx	Scale indication lies between 20 and 80 according to signal level. 0dBm = 80
1kHz-Tx	Correct scale indication is 20 for steady mark and 80 for steady space. 0dBm = 80.

TABLE 2.5 CONTROLS AND INDICATORS (TERMINAL TELEGRAPH 'B')

Control or Indicator	Description
HEATERS/ EQPT	Switches a.c. supply either to the equipment or to the anti-condensation heaters.
HEATERS	Indicator illuminated when HEATERS/EQPT switch set to HEATERS.
EQPT	Indicator illuminated when HEATERS/EQPT switch set to EQPT.
Fuses	3A fuses fitted in main a.c. supply.
NORM/ INVERT	Provides an inverted output from receive section of modem.
A (21 Positions)	Selects required A-Tone frequency for incoming and outgoing signals (see Table 2.3). Indicator lamp flashes when A-channel traffic greater than -16dBm is present: can therefore be lit or out continuously depending on composition of signals.
Z (21 Positions)	Selects required Z-Tone frequency for incoming and outgoing signals (see Table 2.3). Indicator operates in similar fashion to that of A indicator in the presence of traffic.

(Contd)

Control or Indicator	Description
BANDWIDTH (3 Positions)	Selects bandwidth (NARROW, MEDIUM, WIDE) according to requirements for incoming signals. NOTE The NARROW position must be selected only when A = 21 is selected on the A selection switch (see Table 2.3).
MODE (2 Positions)	Selects mode of operation.
NORMAL	Each channel operates independently.
DIVERSITY	Channel 1 and channel 2 received traffic are summed in channel 1. Resultant appears at channel 1 output.
CHANNEL (2 Positions)	Selects channel 1 or 2 for monitoring by FUNCTION SELECT meter switch.
FUNCTION SELECT	Meter switch for monitoring selected parameter. Used in conjunction with panel meter.
+5V +15V -15V	In any of these positions, correct voltage indication shown as 50 on meter scale (±2 divisions).
FSK-Rx	Correct scale indication lies between 20 and 80 according to signal level.
1kHz-Rx	Correct scale indication is 20 for MARK condition; 80 for SPACE condition. 0dBm = 80.

PART 3

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TECHNICAL DESCRIPTION

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PART 3A

CHAPTER 1

FIMS PREFACE

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PART 3A

CHAPTER 1

FIMS PREFACE

INTRODUCTION

1. The Functionally Identified Maintenance System (FIMS) is a method of presenting technical information to enable the maintainer, given the initial fault symptoms, to trace a fault rapidly from system to replaceable sub-assembly or component level by a series of logical processes.

2. Supplementary information is provided in this part of the handbook to enable conventional fault diagnosis techniques to be used, if required.

FIMS FORMATS

3. Each level of FIMS consists of a package, which depicts all the information at that level, using the following:

(a) Diagnostic Aid. This is provided by the following set of formats: Functional Block Diagram (FBD) + Maintenance Dependency Chart (MDC) + Test Data Chart (TDC). The MDC provides a diagrammatic representation of the input/output relationships of the various functions in the different modes of operation; the TDC gives details of the availability of test points, suitable test equipment and its settings, and where and how to measure the expected result; and the FBD is used, if required, to define the relationship between the higher level (general), and the lower level (specific) signal titles.

(b) Layout Diagram (LOD). This shows the physical location of the hardware, test points referred to in other formats in the package, and where necessary provides sub-assembly removal and replacement information.

(c) Supplementary Information (SI). This provides information that cannot be incorporated in the other formats, e.g. cabinet wiring information.

(d) Parts Lists. Provides spares information for hardware defined in individual packages.

DIAGNOSIS USING FIMS

4. The instructions given in each package enable the maintainer to work from the highest level to the replaceable item or component level in a logical manner. Having completed the fault diagnosis, and carried out the repairs required, the performance checks detailed in the Part 3B of the handbook should be carried out.

(a) Entry to an MDC is obtained by one of two methods:

(i) At the master (M) level, from analysis of initial fault symptoms.

(ii) From a higher level MDC; determine which output has failed, using the FBD if necessary to relate the higher level signal title (general) to the lower level signal title (specific), and locate this under the outputs heading on t

(b) Modes. If an event on an MDC appears more than once in the column, then determine from the left hand (operations) column the mode in which the system is operating.

(c) Carry out fault diagnosis using half-split techniques until the faulty function has been determined. The TD numbers for each event refer to checks on the TDC to validate the event.

DIAGNOSIS USING CONVENTIONAL TECHNIQUES

5. Conventional fault diagnosis techniques must be used. When the faulty item has been replaced and the fault is not cleared, a number of formats are available to aid the maintainer.

(a) FBD + BT. The blocked text gives information on the function, often beyond that required for FIMS diagnosis. The lower levels give details of hardware and wiring, where necessary in conjunction with SI wiring diagrams. From this information all wiring paths can be traced in the event of a fault occurring.

(b) TDC. This provides information regarding signal levels on each wire, and the conditions under which they are present.

(c) SI. This provides wiring diagrams, and additional technical information where required.

PART 3A

CHAPTER 2

GLOSSARY OF TERMS AND SYMBOLS

CONTENTS

PART 3A

CHAPTER 2

GLOSSARY OF TERMS AND SYMBOLS

DIAGRAM TITLES

1.	FBD	Functional Block Diagram
	BT	Blocked Text
	LOD	Layout Diagram
	MDC	Maintenance Dependency Chart
	TDC	Test Data Chart
	SI	Supplementary Information

LOCATION CODING

2. To assist in the location of hardware items, alpha-numeric coding is used from unit down to sub-assembly level. Components are located by their circuit reference.

(a) The front panel and chassis of a unit is designated number 1, the chassis being divided into areas located by the letters A to D. The back panel of the unit housing is designated area E. Sub-assemblies within these areas are numbered from 1. The location codes on MDC and TDC are written in the form 1A4; ie PEC number 4 in area A of the chassis, but the locations have been individually identified on FBD and LOD as follows:

(i) FBD: The code is boxed in the bottom left hand corner of the location boundary.

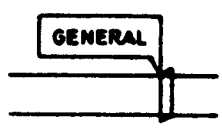
(ii) LOD: The code is boxed adjacent to the relevant hardware area.

FBD SYMBOLS

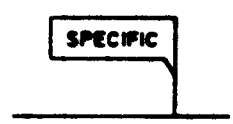
3.(a) Function boundary shown by continuous line surrounding the functional area.

(b) Hardware boundary shown by chain-dotted line surrounding hardware area. Two weights of line have been used for clarity.

(c) Signal flags



Grouped Signals



Single Signals

Flags on output signals from the function passage are shown in bolt outline.

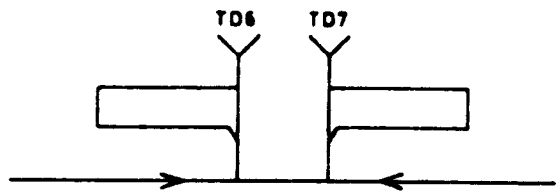
Direction of signal flow is

Flag pointer at right-hand end of flag signal direction left to right.
Flag pointer at left-hand end of flag signal direction right to left.

(d) Test data (TD) reference.

Indicates the location of test data reference (not testing points). The letters TD prefix the reference number.

(e) Signal falg with TD reference.



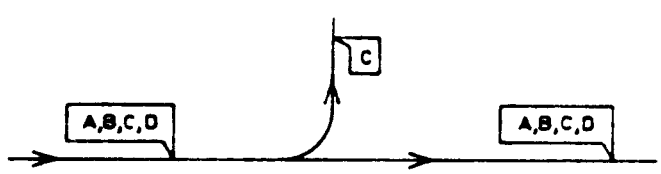
Used where a single line represents more than one signal. The signal title is directly related to its TD reference.

(f) Directional flow. In general, the direction of signal flow is from left to right, services such as power supplies are normally fed into the bottom of the function. Any divergence from the normal is indicated by means of arrows, eg as follows:

Flow from right to left

Signal feedback

(g) Where a single signal line diverges from a group of signal lines, it is indicated thus:



MDC AND TDC SYMBOLS

4.(a) Event accessibility symbols.

Easy access (front panel, top of cabinet, etc.).

Medium access (by removing a panel or withdrawing equipment or unit).

Difficult access (requiring use of tools for dismantling).

(b) Event clarification coding.

A	Available for measurement using test equipment.
NA	Not available, eg other conditions may be disturbed.
IND	Direct visual indication, ie panel lamp or meter.
MON	Event monitored using built-in metering.
PCD	Event verified using a procedure to determine its effect on other events. A failure of this check does not necessarily indicate a failure of the event; where alternative measuring points are available these should also be checked.

(c) Function symbols.

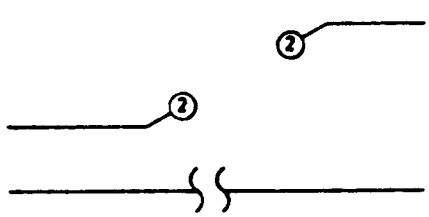
●	Complete function
◐	Part function.

(d) Dependency symbols.

▲	Dependency marker.
△	Not dependency, ie event must not be present.
◆	Double Dependency marker. Used where dependent event is referred from the bottom to the top of the chart.
◇	Double Not-dependency. Used where not-dependent event is referred from the bottom of the top of the chart.

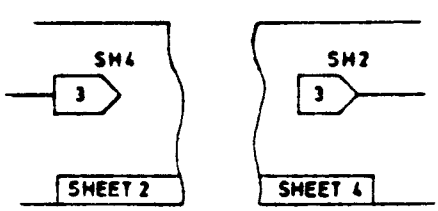
SYMBOLS IN GENERAL USE

5.(a) Line continuation markers.



Used where information is continued within a sheet.
The ends of the line are either number referenced, or broken as shown.

(b) Sheet continuation markers.



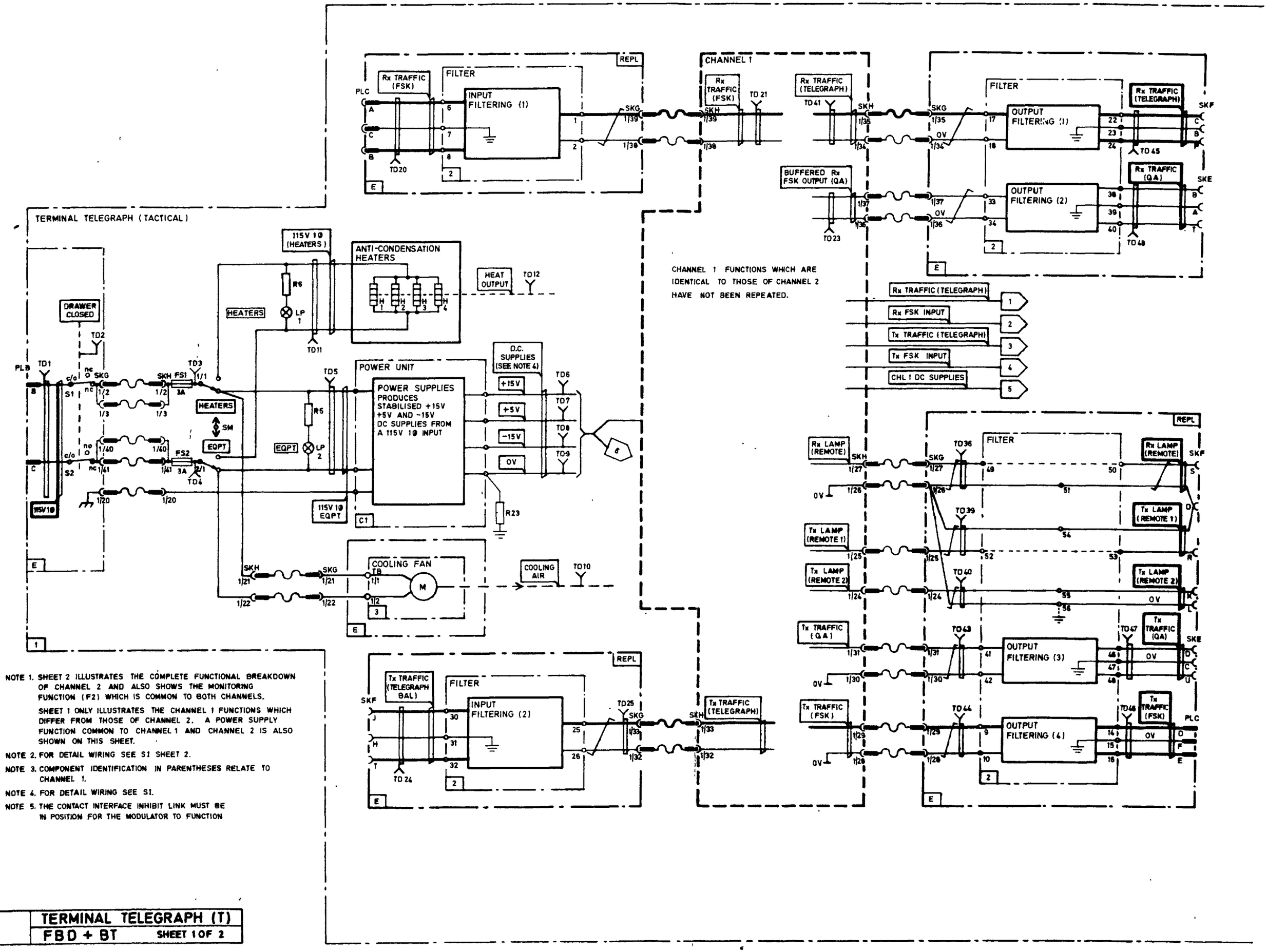
Used where information is continued on another sheet. The number referencing identifies the continuation. If only two sheets to consider, then sheet numbers are not given.

PART 3A

CHAPTER 3

TECHNICAL DESCRIPTION: TERMINAL TELEGRAPH (T)

CONTENTS



NOTE 1. SHEET 2 ILLUSTRATES THE COMPLETE FUNCTIONAL BREAKDOWN OF CHANNEL 2 AND ALSO SHOWS THE MONITORING FUNCTION (F2) WHICH IS COMMON TO BOTH CHANNELS.

SHEET 1 ONLY ILLUSTRATES THE CHANNEL 1 FUNCTIONS WHICH DIFFER FROM THOSE OF CHANNEL 2. A POWER SUPPLY FUNCTION COMMON TO CHANNEL 1 AND CHANNEL 2 IS ALSO SHOWN ON THIS SHEET.

NOTE 2. FOR DETAIL WIRING SEE S1 SHEET 2.

NOTE 3. COMPONENT IDENTIFICATION IN PARENTHESES RELATE TO CHANNEL 1.

NOTE 4. FOR DETAIL WIRING SEE S1.

NOTE 5. THE CONTACT INTERFACE INHIBIT LINK MUST BE IN POSITION FOR THE MODULATOR TO FUNCTION

M	TERMINAL TELEGRAPH (T)
	FBD + BT SHEET 1 OF 2

CHANNEL 2 REFERENCES IN PARENTHESES ARE UNIQUE TO CHANNEL 1

REPL

FILTER

Rx TRAFFIC (FSK)

INPUT FILTERING (1)

PLA

TD20

SKG

SKH

TD21

Rx TRAFFIC (FSK)

Rx TRAFFIC PROCESSING

F1

CONVERTS THE 2-TONE VOICE FREQUENCY INPUT SIGNAL (Rx TRAFFIC FSK) INTO A 1KHz SINGLE-TONE ON-OFF OUTPUT SIGNAL (Rx TRAFFIC TELEGRAPH)

TD41

Rx TRAFFIC (TELEGRAPH)

BUFFERED Rx FSK OUTPUT (QA)

TD23

FILTER

OUTPUT FILTERING (1)

OUTPUT FILTERING (2)

Rx TRAFFIC (TELEGRAPH)

Rx TRAFFIC (QA)

TD45

TD48

FREQUENCY SELECTION

SA-1 (SC-1)

SA-2 (SC-2)

SB-1 (SD-1)

SB-2 (SD-2)

(NOTE 2)

A ADDRESS

Z ADDRESS (SEE NOTE 2)

TD13

TD14

TRANSLATOR SIGNAL DATA

REPL

FREQUENCY CONTROL CONVERTS THE 'A' AND 'Z' SWITCH INPUTS TO B C D FORM WHICH IS EMPLOYED TO PRODUCE 'A' AND 'Z' LOCAL OSCILLATOR FREQUENCIES FOR THE Rx. THE B C D VERSIONS OF THE 'A' AND 'Z' SWITCH INPUT IS ALSO APPLIED TOGETHER WITH AN INTERNALLY GENERATED SWITCHED CLOCK TO THE Tx. TRAFFIC PROCESSING

TD16

TD17

SELECTED A LOCAL OSC

SELECTED Z LOCAL OSC

CLOCK

ELECTRONIC SWITCH

REPL

MODE CONTROL

CHECKS THAT THE LEVEL OF THE INCOMING Rx FSK SIGNAL IS OF ADEQUATE LEVEL.

DETERMINES WHETHER THE Rx TRAFFIC (LOGIC) SIGNAL IS VALID (ie NOT NOISE)

GENERATES THE NECESSARY CONTROL SIGNALS TO ENABLE THE Tx AND Rx PROCESSING FUNCTION PROVIDES LAMP DRIVE FACILITIES FOR LOCAL AND REMOTE Tx / Rx LAMPS.

TD34

Rx ENABLE

TD35

CONTROL INHIBIT Rx

TD33

MUTE

TD15

TD22

Rx TRAFFIC (LOGIC)

DC SUPPLIES

METER MONITORING

F2

Rx TRAFFIC (TELEGRAPH)

Rx FSK INPUT

Tx TRAFFIC (TELEGRAPH)

Tx FSK INPUT

CHL 1 DC SUPPLIES

CHL 2 DC SUPPLIES

CHANNEL

FUNCTION SELECT

FSK

1KHz

Rx

Tx

-15V

+15V

+5V

MUTING CONTROL

NARROW MUTE

WIDE MUTE

MODE SELECTION

DUPLEX CONTROL

Rx CONTROL

Tx CONTROL

Tx TRAFFIC (LOGIC)

TD31

TD28

TD29

TD30

A(B)

DC SUPPLIES

+15V

+5V

-15V

0V

MEDIUM

NARROW

WIDE

SJ (SK)

BANDWIDTH

TD32

MODULATOR

REPL

Tx TRAFFIC PROCESSING

CONVERTS THE 1KHz SINGLE-TONE ON-OFF INPUT SIGNAL (Tx TRAFFIC TELEGRAPH) INTO A 2 TONE VOICE FREQUENCY OUTPUT (Tx TRAFFIC FSK). THE ENCODED 'A' AND 'Z' ADDRESS AND SWITCHED CLOCK SIGNALS DETERMINE THE FREQUENCY OF THE OUTPUT.

ENCODED ADDRESS

SWITCHED CLOCK

INHIBIT PLUG

Tx ENABLE

3 SEC DELAY INHIBIT

CONTACT INTERFACE INHIBIT (SEE NOTE 5)

TD19

TD18

TD38

TD37

Tx

LP5 (LP3)

-15V

Rx LAMP (REMOTE)

Tx LAMP (REMOTE1)

Tx LAMP (REMOTE2)

Tx TRAFFIC (QA)

Tx TRAFFIC (FSK)

TD36

TD39

TD40

TD43

TD44

TD47

TD46

OUTPUT FILTERING (3)

OUTPUT FILTERING (4)

Tx TRAFFIC (TELEGRAPH BAL)

TD24

TD25

TD27

TD26

Tx TRAFFIC (TELEGRAPH)

Tx TRAFFIC (TELEGRAPH) (BYPASS)

MODE

Rx

Tx

AUTO

BYPASS

DUPLEX

SG (SH)

TD42

TERMINAL TELEGRAPH(T)

FBD + BT SHEET 2 OF 2

M

3A.3.3

BR8685 (3A)
Original

—

	INPUTS		MICRO SW	FRONT PANEL						POWER SUPPLY UNIT						FAN		FRONT PANEL	ANTI' COND' HEATERS		A & Z SWITCHES		TRANSLATOR SIGNAL DATA						INPUT	FILTER	F1			INPUT	FILTER	MODE SWITCH							BAND-WIDTH SWITCH		MODULATOR	ELECTRONIC SWITCH											F1		MODULATOR		MODE SWITCH	
										REPLACEABLE													REPLACEABLE							REPL					REPL										REPL		REPL														REPL			
			1							1C1						1E3		1	1		1		*							****					****		1							1		***														***		1	
	115 V 1Φ	DRAWER CLOSED	MICRO-SWITCH	FUSE 1	115V 1Φ	FUSE 2	115V 1Φ	SWITCH M	115V 1Φ (EQPT)	POWER SUPPLIES	+15V	+5V	-15V	0V		COOLING FAN	COOLING AIR	115V 1Φ (HTRS)	ANTI' COND' HEATERS	HEAT OUTPUT	FREQUENCY SELECTION	A ADDRESS	Z ADDRESS	FREQUENCY CONTROL	CLOCK	SELECTED A LOCAL OSC	SELECTED Z LOCAL OSC	SWITCHED CLOCK	ENCODED ADDRESS	Rx TRAFFIC (FSK)	INPUT FILTERING (1)	Rx TRAFFIC (FSK)	Rx TRAFFIC PROCESSING	Rx TRAFFIC (LOGIC)	Tx TRAFFIC (TELEGRAPH BAL)	INPUT FILTERING (2)	Tx TRAFFIC (TELEGRAPH)	SG-2 (SH-2)	Tx TRAFFIC (TELEGRAPH BYPASS)	Tx TRAFFIC (TELEGRAPH)	MODE SELECTION	DUPLEX CONTROL	Rx CONTROL	Tx CONTROL	MUTING CONTROL	NARROW OR WIDE MUTE	Tx TRAFFIC PROCESSING	Tx TRAFFIC (LOGIC)	MODE CONTROL	MUTE	Rx ENABLE	CONTROL INHIBIT Rx	Rx LAMP (REMOTE)	3 SEC DELAY INHIBIT	Tx ENABLE	Tx LAMP (REMOTE 1)	Tx LAMP (REMOTE 2)	Rx TRAFFIC PROCESSING	Rx TRAFFIC (TELEGRAPH)	Tx TRAFFIC PROCESSING	Tx TRAFFIC (FSK)	Tx TRAFFIC (QA)	SG-3 (SH-3) & SG-4 (SH-4)	Tx TRAFFIC (FSK)	
TEST DATA No.	1	2			3		4		5		6	7	8	9		10		11		12		13	14		15	16	17	18	19	20		21		22	23	24	25		26	27		28	29	30		31		32		33	34	35	36	37	38	39	40		41		42	43		44	

OPERATIONAL MODES

1. MODE SWITCH NOT SET TO BYPASS OR DUPLEX
2. BANDWIDTH SWITCH SET TO NARROW OR WIDE AS REQUIRED
3. A & Z SWITCHES AT A VALID OPERATIONAL SETTING.

SET MODE SWITCH TO Tx

SET MODE SWITCH TO Rx

SET MODE SWITCH TO AUTO

IF Rx TRAFFIC IS NOT PRESENT Tx TRAFFIC WILL CAUSE Tx MODE OPERATION.

Tx MODE OPERATION IS MAINTAINED FOR 3 SECONDS AFTER CESSATION OF Tx TRAFFIC.

IF 3 SECONDS HAVE ELAPSED SINCE LAST Tx TRAFFIC AND Rx TRAFFIC IS PRESENT THE Rx MODE OF OPERATION WILL BE SELECTED.

Tx TRAFFIC PATH - Tx AND AUTO MODES

SET MODE SWITCH TO BYPASS.

Rx TRAFFIC PATH - Rx AND AUTO MODES

SET EQPT/HTRS SWITCH TO 'HTRS'

SET EQPT/HTRS SWITCH TO 'EQPT'

M	TERMINAL TELEGRAPH (T)
	MDC SHEET 1 OF 4

	CONTINUED FROM SHEET 1							OUTPUTS												
								FILTER							FILTER					
								REPLACEABLE							REPL					
								****							****					
	Rx TRAFFIC (TELEGRAPH)	Tx TRAFFIC (FSK)	Tx TRAFFIC (QA)				BUFFERED Rx FSK OUTPUT (QA)	OUTPUT FILTERING (1)	Rx TRAFFIC (TELEGRAPH)	OUTPUT FILTERING (4)	Tx TRAFFIC (FSK)	OUTPUT FILTERING (3)	Tx TRAFFIC (QA)		OUTPUT FILTERING (2)	Rx TRAFFIC (QA)	Rx LAMP (REMOTE)	Tx LAMP (REMOTE 1)	Tx LAMP (REMOTE 2)	
TEST DATA No.	41	44	43				23		45		46		47			48	36	39	40	
PROCEDURE AS SHEET 1																				
1							A													
2																		PCD	PCD	
3																	PCD			
4																		PCD	PCD	
5																		PCD	PCD	
6															PCD					
7							A													
8							A													
9							A													
10							MON													
															PCD					
														PCD						
													A							
												A								

	LOCATION CODES									
	*		**		***		****	
CHL 2	1A	6	1A	2	1A	1	1E	1
CHL 1	1B	6	1B	2	1B	1	1E	2

	INPUTS		MICRO SW	FRONT PANEL						POWER SUPPLY UNIT					FAN		FRONT PANEL	ANTI-COND' HTRS		'A' AND 'Z' SWITCHES		TRANSLATOR SIGNAL DATA								INPUT	FILTER		F1			INPUT	FILTER		MODE SWITCH					BAND WIDTH SWITCH	MODULATOR	ELECTRONIC SWITCH											F1		MODULATOR		MODE SWITCH	
										REPLACEABLE											REPLACEABLE										REPL					REPL						REPL	REPLACEABLE													REPL			
			1	1						1C3					1E3		1	1		1		*								****					****			1			1	***	* *												* * *		1	
	115V 1Ø	DRAWER CLOSED	MICRO-SWITCH	FUSE 1	115V 1Ø	FUSE 2	115V 1Ø	SWITCH M	115V 1Ø (EQPT)	POWER SUPPLIES	+15V	+5V	-15V	0V	COOLING FAN	COOLING AIR	115V 1Ø (HTRS)	ANTI-COND' HEATERS	HEAT OUTPUT	FREQUENCY SELECTION	A ADDRESS	Z ADDRESS	FREQUENCY CONTROL	CLOCK	SELECTED 'A' LOCAL OSC	SELECTED 'Z' LOCAL OSC	SWITCHED CLOCK	ENCODED ADDRESS	Rx TRAFFIC (FSK)	INPUT FILTERING (1)	Rx TRAFFIC (FSK)	Rx TRAFFIC PROCESSING	Rx TRAFFIC (LOGIC)	BUFFERED Rx FSK OUTPUT (QA)	Tx TRAFFIC (TELEGRAPH BAL)	INPUT FILTERING (2)	Tx TRAFFIC (TELEGRAPH)	SG-2 (SH-2)	Tx TRAFFIC (TELEGRAPH)	MODE SELECTION	DUPLEX CONTROL	Rx CONTROL	Tx CONTROL	MUTE CONTROL	NARROW OR WIDE MUTE	Tx TRAFFIC PROCESSING	Tx TRAFFIC (LOGIC)	MODE CONTROL	MUTE	Rx ENABLE	CONTROL INHIBIT Rx	Rx LAMP (REMOTE)	3 SEC DELAY INHIBIT	Tx ENABLE	Tx LAMP (REMOTE 1)	Tx LAMP (REMOTE 2)	Rx TRAFFIC PROCESSING	Rx TRAFFIC (TELEGRAPH)	Tx TRAFFIC PROCESSING	Tx TRAFFIC (FSK)	TX TRAFFIC (QA)	SG-3 (SH-3) & SG-4 (SH-4)	Tx TRAFFIC (FSK)	
TEST DATA No.	1	2			3		4		5		6	7	8	9		10	11		12		13	14		15	16	17	18	19	20		21		22	23	24		25		27		28	29	30	31		32		33	34	35	36	37	38	39	40		41		42	43		44	

TEST MODE

1. MODE SWITCH SET TO DUPLEX
2. BANDWIDTH SWITCH SET AS REQUIRED.
3. 'A' & 'Z' SWITCHES AT A VALID OPERATIONAL SETTING.

Tx TRAFFIC WILL CAUSE Tx CHANNEL TO BE ENABLED

Rx TRAFFIC WILL CAUSE Rx CHANNEL TO BE ENABLED

SET EQPT/HTRS SWITCH TO 'HTRS'

SET EQPT/HTRS SWITCH TO 'EQPT'

NOTE REFERENCE IN PARENTHESIS ARE UNIQUE TO CHANNEL 1

M	TERMINAL TELEGRAPH (T)
	MDC SHEET 3 OF 4

	OUTPUTS											
	FILTER											
	REPLACEABLE											
	****											
	OUTPUT FILTERING (2)	Rx TRAFFIC (QA)	OUTPUT FILTERING (1)	Rx TRAFFIC (TELEGRAPH BAL)	OUTPUT FILTERING (3)	Tx TRAFFIC (QA)	OUTPUT FILTERING (4)	Tx TRAFFIC (FSK)	Rx LAMP (REMOTE)	Tx LAMP (REMOTE 1)	Tx LAMP (REMOTE 2)	
TEST DATA No.		48		45		47		46	36	39	40	
AS SHEET 1												

1 → PCD PCD

2 → PCD

3 → A

4 → PCD

5 → A

6 → PCD

	LOCATION CODES				
	*	* *	***	****	
CHL 2	1A6	1A2	1A1	1E1	
CHL 1	1B6	1B2	1B1	1E2	

TERMINAL TELEGRAPH(T)	M
MDC SHEET 4 OF 4	

TD	SIGNAL TITLE	MAIN MEASURING POINTS				ALTERNATIVE MEASURING POINTS				TEST EQUIPMENT		PROCEDURES	INDICATIONS
		AVAIL ACCESS	AT	WITH RESPECT TO	LOC	AVAIL ACCESS	AT	WITH RESPECT TO	LOC	IDENTITY	SETTING		
1	115V 1Ø	A	SKB-B	SKB-C	1E					MULTIMETER (ITEM 1)	AC VOLTS, 300VOLTS RANGE	DISCONNECT SKB	115 V ±10%
			SKG 1-20	CHASSIS	1E					MULTIMETER (ITEM 1)	OHMS, OHMS RANGE	PERFORM CHECK WITH SKB CONNECTED	< 1Ω
2	DRAWER CLOSED	IND										ENSURE THAT MICRO-SWITCH OPERATING MECHANISM IS OPERATED IF DRAWER IS OPEN.	DRAWER CLOSED
3	115V 1Ø	A	FUSE 1 (CENTRE)	FUSE 2 (CENTRE)	1D1					MULTIMETER (ITEM 1)	AC VOLTS, 300 VOLTS RANGE		115 V ±10%
4	115 V 1Ø	A	FUSE 2 (CENTRE)	FUSE 1 (CENTRE)	1					MULTIMETER (ITEM 1)	AC VOLTS, 300 VOLTS RANGE		115 V ±10%
5	115 V 1Ø (EQPT)	IND	FRONT PANEL 'EQPT' LAMP		1								LAMP ILLUMINATED
6	+15V	MON	METER ON FRONT PANEL		1							SET CHANNEL SWITCH TO 1 OR 2 AS REQUIRED. SET FUNCTION SWITCH TO +15V	50% FSD ± 2 DIVISIONS
						A	TP 3 TP 5 TP 2 TP 2	TP 10 TP 9 TP 13 TP 12	1A1 (1B1) 1A2 (1B2) 1A3 (1B3) 1A6 (1B6)	MULTIMETER (ITEM 1)	30V DC		+15 V ±0·75V
7	+5 V	MON	METER ON FRONT PANEL		1							SET CHANNEL SWITCH TO 1 OR 2 AS REQUIRED. SET FUNCTION SWITCH TO +5V	50% FSD ± 2 DIVISIONS
						A	TP 1 TP 6 TP 1	TP 10 TP 9 TP 12	1A1 (1B1) 1A2 (1B2) 1A6 (1B6)	MULTIMETER (ITEM 1)	10V DC		+5 V ±0·25V
8	−15V	MON	METER ON FRONT PANEL		1							SET CHANNEL SWITCH TO 1 OR 2 AS REQUIRED. SET FUNCTION SWITCH TO −15V	50% FSD ± 2 DIVISIONS
						A	TP 4 TP 1 TP 4 TP 10	TP 10 TP 9 TP 13 TP 12	1A1 (1B1) 1A2 (1B2) 1A3 (1B3) 1A6 (1B6)	MULTIMETER (ITEM 1)	30V DC		−15 V ±0·75V
9	0V	PCD	VALID IF TD6,7 OR 8 VALID										
10	COOLING AIR	IND			1E3								FAN RUNNING
11	115V 1Ø (HTRS)	IND	FRONT PANEL 'HTRS' LAMP		1								LAMP ILLUMINATED
12	HEAT OUTPUT	IND	ANTI-COND' HEATERS		1								HEATERS PRODUCING HEAT
13	A ADDRESS	PCD										SIGNAL PRESENT IF TD16 IS VALID. ALSO VALIDATED IF EQUIPMENT OPERATES CORRECTLY IN EITHER Tx OR Rx MODE.	
14	Z ADDRESS	PCD										SIGNAL PRESENT IF TD17 IS VALID. ALSO VALIDATED IF EQUIPMENT OPERATES IN EITHER Tx OR Rx MODE.	
15	CLOCK	A	TP 4	TP 12	1A6 (1B6)	A	TP 4	TP 9	1A2 (1B2)	COUNTER FREQUENCY (ITEM 2)	FUNCTION SWITCH SET TO 'FREQ Kc/s'		COUNTER READS 2·785200 MHz ±0·1%

NOTE REFERENCES IN PARENTHESES ARE UNIQUE TO CHANNEL 1

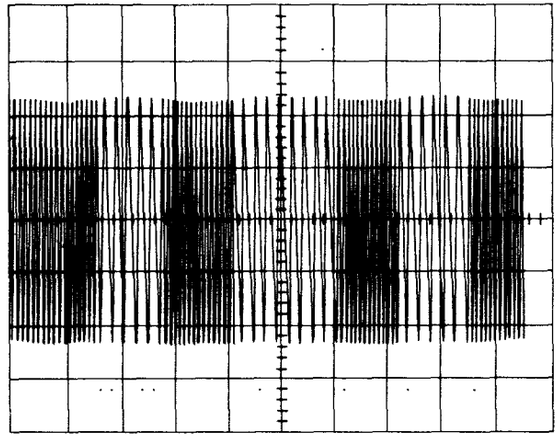
TD	SIGNAL TITLE	MAIN MEASURING POINTS: AVAIL ACCESS	MAIN MEASURING POINTS: AT	MAIN MEASURING POINTS: WITH RESPECT TO	MAIN MEASURING POINTS: LOC	ALTERNATIVE MEASURING POINTS: AVAIL ACCESS	ALTERNATIVE MEASURING POINTS: AT	ALTERNATIVE MEASURING POINTS: WITH RESPECT TO	ALTERNATIVE MEASURING POINTS: LOC	TEST EQUIPMENT: IDENTITY	TEST EQUIPMENT: SETTING	PROCEDURES	INDICATIONS
16	SELECTED A LOCAL OSC	A	TP8	TP12	1A6 (1B6)					COUNTER FREQUENCY (ITEM 2)	FUNCTION SWITCH TO 'FREQ Kc/s'	SET A SWITCH TO POS'N 1 — " — 4: ROTATE Z SWITCH THROUGH POSITIONS 1-16 INCLUSIVE FOR EACH SETTING OF THE A SWITCH SET A SWITCH TO POS'N 17 — " — 21: SET Z SWITCH TO POSITION 17 OR 18 / 17 OR 18 / 19 OR 20 / 20 OR 19 / 21	COUNTER READS 7225Hz — " — 7395Hz, 7565Hz, 7735Hz, 7905Hz, 8075Hz, 8245Hz, 8415Hz, 8585Hz, 8755Hz, 8925Hz, 9095Hz, 9265Hz, 9435Hz, 9605Hz, 9775Hz ±5Hz 7300Hz, 7500Hz, 8375Hz, 9225Hz, 9600Hz
17	SELECTED Z LOCAL OSC	A	TP9	TP12	1A6 (1B6)					COUNTER FREQUENCY (ITEM 2)	FUNCTION SWITCH TO 'FREQ Kc/s'	SET Z SWITCH TO POS'N 1 — " — 5: ROTATE A SWITCH THROUGH POSITIONS 1-16 INCLUSIVE FOR EACH SETTING OF THE Z SWITCH. SET Z SWITCH TO POS'N 17 — " — 21: SET A SWITCH TO POSITION 17 OR 18 / 17 OR 18 / 19 OR 20 / 20 OR 19 / 21	COUNTER READS 7225Hz — " — 7395Hz, 7565Hz, 7735Hz, 7905Hz, 8075Hz, 8245Hz, 8415Hz, 8585Hz, 8755Hz, 8925Hz, 9095Hz, 9265Hz, 9435Hz, 9605Hz, 9775Hz ±5Hz 7300Hz, 7500Hz, 8375Hz, 9225Hz, 9600Hz
18	SWITCHED CLOCK	A	TP3	TP12	1A6 (1B6)	A	TP8	TP10	1A1 (1B1)	COUNTER FREQUENCY (ITEM 2)	FUNCTION SWITCH TO 'FREQ Kc/s'	SET A SWITCH TO POS'N (1-16) AND Z SWITCH TO POS'N (1-16) SET A SWITCH TO POS'N 17 AND Z SWITCH TO POS'N 18	2·785280 MHz ±0·1% 3·278800 MHz ±0·1%
19	ENCODED ADDRESS	ECO										SIGNAL PRESENT IF TD16 AND TD17 ARE VALID	
20	Rx TRAFFIC (FSK)	A	SKA-A (SKC-A) SKA-B (SKC-B)	SKA-C (SKC-C)	1E1 (1E2)					OSCILLOSCOPE (ITEM 3)		DISCONNECT SKA (SKC)	SEE WAVEFORMS A,B & C
21	Rx TRAFFIC (FSK)	MON	FRONT PANEL METER		1							SET CHANNEL SWITCH TO '1' OR '2' AS REQUIRED AND FUNCTION SWITCH TO 'Rx - FSK'	80% ± 3 DIV FOR 0 dBm INPUT LEVEL
22	Rx TRAFFIC (LOGIC)	A	TP1	TP13	1A3 (1B3)					LOGIC PROBE (ITEM 15)	COUNT		H21
23	BUFFERED Rx FSK OUTPUT (QA)	A	SKH 1-6 (SKH 1-37)	SK1-7 (SKH 1-36)	1D1					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORMS A,B & C
24	Tx TRAFFIC (TELEGRAPH BAL)	A	SKD-J (SKF-J) SKD-T (SKF-T)	SKD-H (SKF-H)	1E1 (1E2)					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM D
25	Tx TRAFFIC (TELEGRAPH)	A	SKG 1-10 (SKG 1-33)	SKG 1-11 (SKG 1-32)	1D1					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM D
26	Tx TRAFFIC (TELEGRAPH BYPASS)	A	SG2-1 (SH2-1)	SG4-1 (SH4-1)	1					OSCILLOSCOPE (ITEM 3)		SET MODE SWITCH TO 'BYPASS'	SEE WAVEFORM D
27	Tx TRAFFIC (TELEGRAPH)	MON	FRONT PANEL METER		1							SET CHANNEL SWITCH TO '1' OR '2' AS REQUIRED AND FUNCTION SWITCH TO 'Tx - 1KHz'	METER READING FLUCTUATES (WITH Tx TRAFFIC) BETWEEN 20 - 80 % FSD
28	DUPLEX CONTROL	A	SG1-5 (SH1-5)	TP6	1A2 (1B2)					MULTIMETER (ITEM 1)	DC VOLTS, 10 VOLTS RANGE	SET MODE SWITCH TO DUPLEX	-5V ± 0·25V
29	Rx CONTROL	A	SG1-3 (SH1-3)	TP6	1A2 (1B2)					MULTIMETER (ITEM 1)	DC VOLTS, 10 VOLTS RANGE	SET MODE SWITCH TO 'Rx'	-5V ± 0·25V
30	Tx CONTROL	A	SG1-1 (SH1-1)	TP6	1A2 (1B2)					MULTIMETER (ITEM 1)	DC VOLTS, 10 VOLTS RANGE	SET MODE SWITCH TO 'Tx' OR BYPASS	-5V ± 0·25V

NOTE MEASURING POINTS AND A-N REFERENCES IN PARENTHESES ARE UNIQUE TO CHANNEL 1

TD	SIGNAL TITLE	MAIN MEASURING POINTS				ALTERNATIVE MEASURING POINTS				TEST EQUIPMENT		PROCEDURES	INDICATIONS
		AVAIL ACCESS	AT	WITH RESPECT TO	LOC	AVAIL ACCESS	AT	WITH RESPECT TO	LOC	IDENTITY	SETTING		
31	NARROW MUTE	A	SJ8-1 (SK8-1)	TP 6	1A2 (1B2)					MULTIMETER (ITEM 1)	DC VOLTS, 10 VOLTS RANGE	SET BANDWIDTH SWITCH TO 'NARROW'	−5 V ±0·25V
	WIDE MUTE		SJ8-3 (SK8-3)									SET BANDWIDTH SWITCH TO 'WIDE' OR 'MED'	
32	Tx TRAFFIC (LOGIC)	A	TP9	TP10	1A1 (1B1)					LOGIC PROBE	COUNT	INDICATION PRESENT WHEN TRAFFIC BEING SENT	H21
33	MUTE	IND	LED D1		1A2 (1B2)							ENSURE THAT THERE IS NOT EXCESSIVE NOISE ON Rx FSK AT TD20	LED EXTINGUISHED
34	Rx ENABLE	PCD										SIGNAL PRESENT IF TD 35 IS AVAILABLE	
35	CONTROL INHIBIT Rx	IND	FRONT PANEL 'Rx' LAMP		1								LAMP ILLUMINATED
36	Rx LAMP (REMOTE)	PCD	SKD-S (SKF-S)	SKD-D (SKF-D)	1E1 (1E2)					MULTIMETER (ITEM 1)	DC VOLTS, 10 VOLTS RANGE	SIGNAL IS VALID IF Rx LAMP IS ILLUMINATED	+4·5V ±0·5V
37	3 SEC DELAY INHIBIT	IND	FRONT PANEL Tx LAMP		1								LAMP ILLUMINATED
38	Tx ENABLE	IND	LED D3		1A2 (1B2)								LED EXTINGUISHED
39	Tx LAMP (REMOTE 1)	PCD	SKD-R (SKF-R)	SKD-D (SKF-D)	1E1 (1E2)					MULTIMETER (ITEM 1)	DC VOLTS, 10 VOLTS RANGE	SIGNAL IS VALID IF 'REMOTE Tx (1)' LAMP IS ILLUMINATED	+4·5V ±0·5V
40	Tx LAMP (REMOTE 2)	PCD	SKD-K (SKF-K)	SKD-L (SKF-L)	1E1 (1E2)					MULTIMETER (ITEM 1)	DC VOLTS, 30 VOLTS RANGE	SIGNAL IS VALID IF 'REMOTE Tx (2)' LAMP IS ILLUMINATED	+14·75V ±0·75V
41	Rx TRAFFIC (TELEGRAPH)	MON	FRONT PANEL METER		1							SET CHANNEL SWITCH TO '1' OR '2' AS REQUIRED AND FUNCTION SWITCH TO 'Rx -1KHz	METER READING FLUCTUATES (WITH Rx TRAFFIC) BETWEEN 20-80% FSD
42	Tx TRAFFIC (FSK)	MON	FRONT PANEL METER		1							SET CHANNEL SWITCH TO '1' OR '2' AS REQUIRED AND FUNCTION SWITCH TO 'Tx-FSK'	METER READING 80% FSD ±3 DIV FOR 0dBm
43	Tx TRAFFIC (QA)	A	SKH 1-12 (SKH 1-31)	SKH1-13 (SKH1-30)		A	SKE-W (SKE-N)	SKE-G (SKE-C)	1E1 (1E2)	OSCILLOSCOPE (ITEM 3)			SEE WAVEFORMS A, B & C
							SKE-H (SKE-D)	SKE-G (SKE-C)	1E1 (1E2)				
44	Tx TRAFFIC (FSK)	A	SG3-W (SH3-W)	TP8	1A1					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORMS A, B & C
45	Rx TRAFFIC (TELEGRAPH)	A	SKD-C (SKF-C) / SKD-P (SKF-P)	SKD-B (SKF-B)	1E1 (1E2)					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM D
46	Tx TRAFFIC (FSK)	A	PLA-D (PLC-D) / PLA-E (PLC-E)	PLA-F (PLC-F)	1E1 (1E2)					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORMS A, B & C
47	Tx TRAFFIC (QA)	PCD	QUALITY ASSESSOR									IF QUALITY ASSESSOR INDICATES THAT Tx FSK OUTPUT IS SATISFACTORY, THIS SIGNAL IS VALIDATED.	
48	Rx TRAFFIC (QA)	PCD	QUALITY ASSESSOR									IF QUALITY ASSESSOR INDICATES THAT THE Rx FSK INPUT IS SATISFACTORY, THIS SIGNAL IS VALIDATED.	

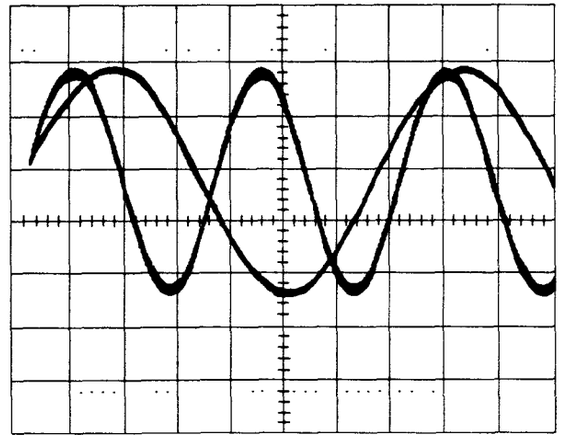
NOTE MEASURING POINTS AND A-N REFERENCES IN PARENTHESES ARE UNIQUE CHANNEL 1

WAVEFORM 'A'
AMPLITUDE 0.5V/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER



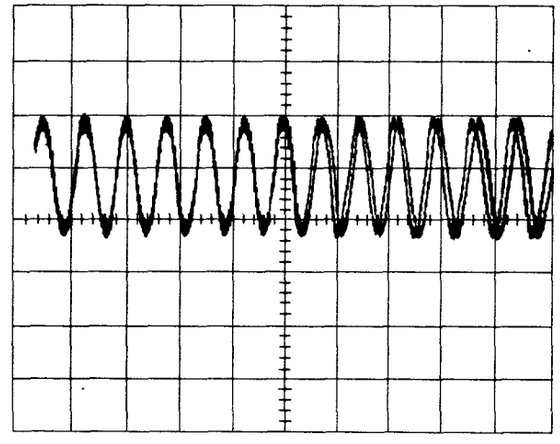
THIS WAVEFORM ILLUSTRATES A TYPICAL FSK SIGNAL AT 0dBM. IN THIS CASE THE TWO FREQUENCIES ARE CLEARLY DISTINGUISHABLE IN THE EVENT THAT THIS IS NOT THE CASE THEN WAVEFORMS 'B' AND 'C' SHOULD BE REFERRED TO
NB WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED.

WAVEFORM 'B'
AMPLITUDE 0.5V/DIV
TIMEBASE 200μS/DIV
INTERNAL TRIGGER



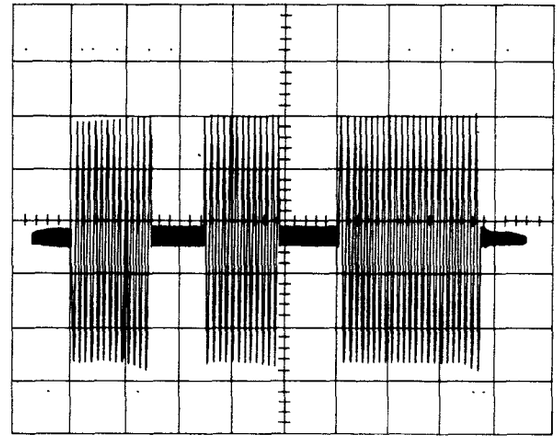
THIS WAVEFORM ILLUSTRATES THE TWO COMPONENT FREQUENCIES OF A TYPICAL FSK SIGNAL WITH A RELATIVELY WIDE FREQUENCY SHIFT. THE TWO FREQUENCIES MAY BE CALCULATED BY OBSERVING THIS WAVEFORM
NB WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

WAVEFORM 'C'
AMPLITUDE 1.0V/DIV
TIMEBASE 200μS/DIV
INTERNAL TRIGGER

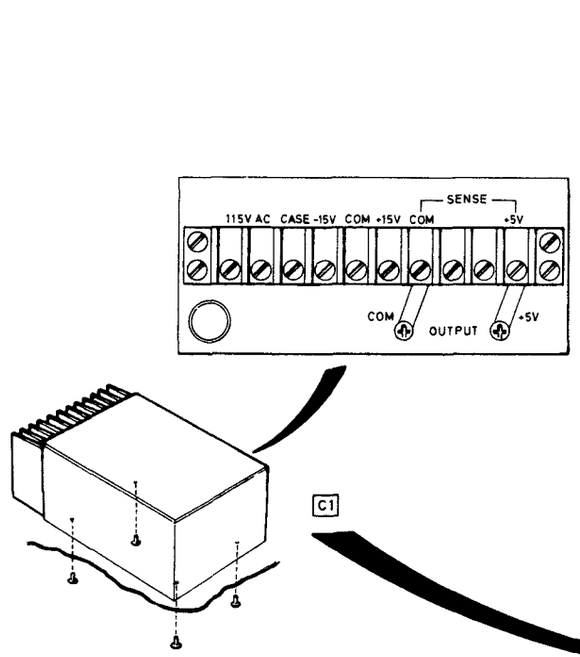


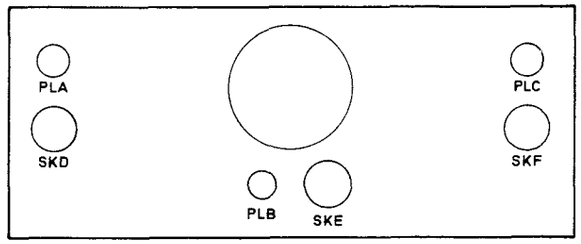
THIS WAVEFORM ILLUSTRATES THE TWO COMPONENT FREQUENCIES OF AN FSK SIGNAL WITH A NARROW FREQUENCY SHIFT
NB WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

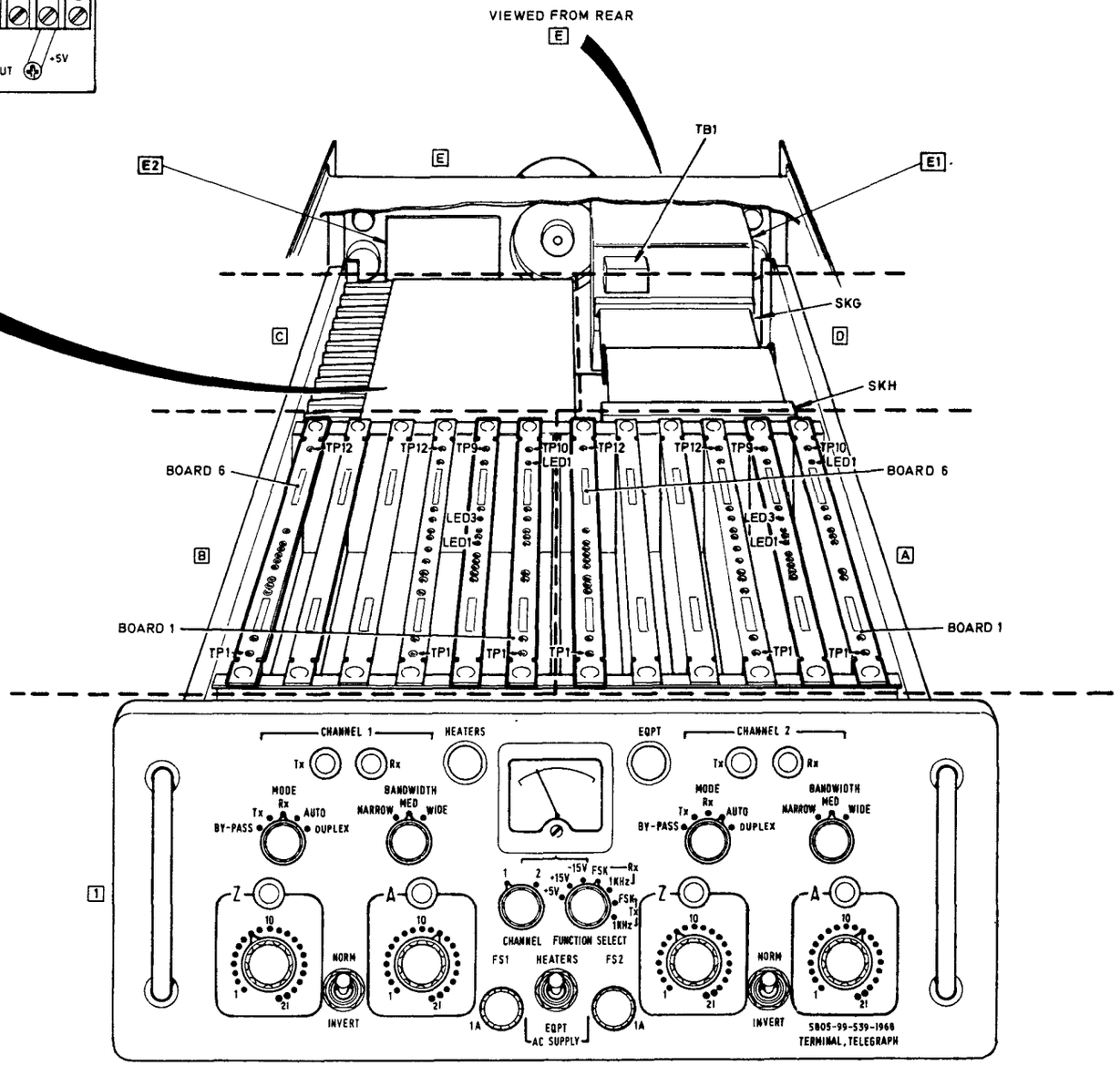
WAVEFORM 'D'
AMPLITUDE 0.5V/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER

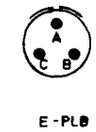


THIS WAVEFORM ILLUSTRATES A 1KHz ON/OFF SIGNAL. THE MARK/SPACE RELATIONSHIP SHOULD BE CLEARLY OBSERVABLE
NB. WHEN OBSERVING WAVEFORM AT SKD (SKF) AMPLITUDE WILL BE HALVED

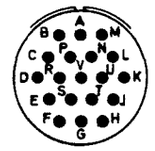






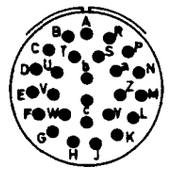


E-PLB

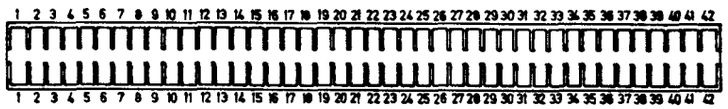


E-SKD
E-SKF

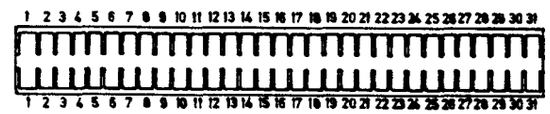
E-PLA
E-PLC



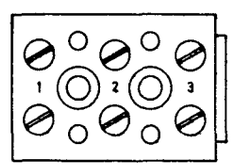
E-SKE



E-SKG
D-SKH

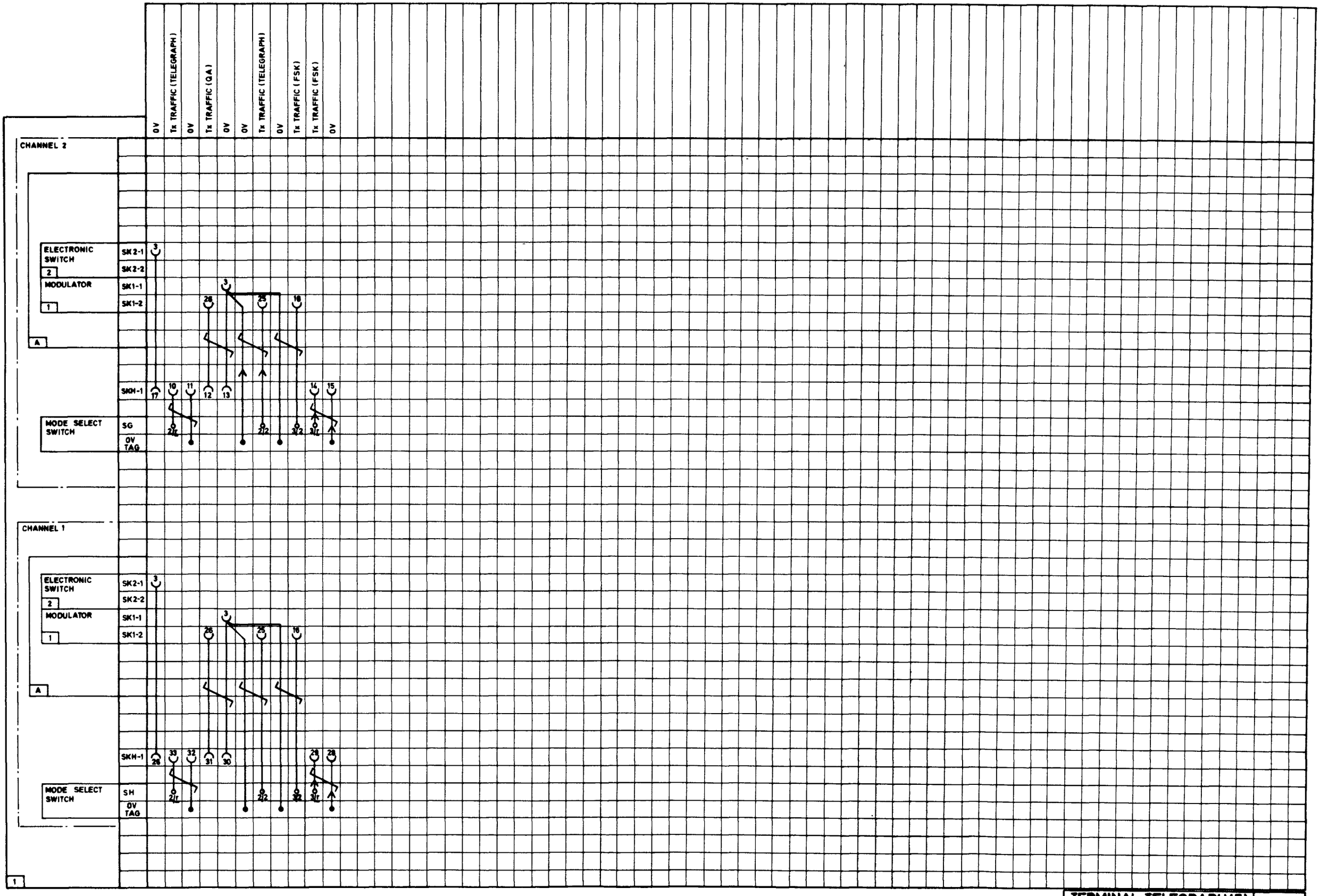


A-SK1-6
B-SK1-6



E-TB1

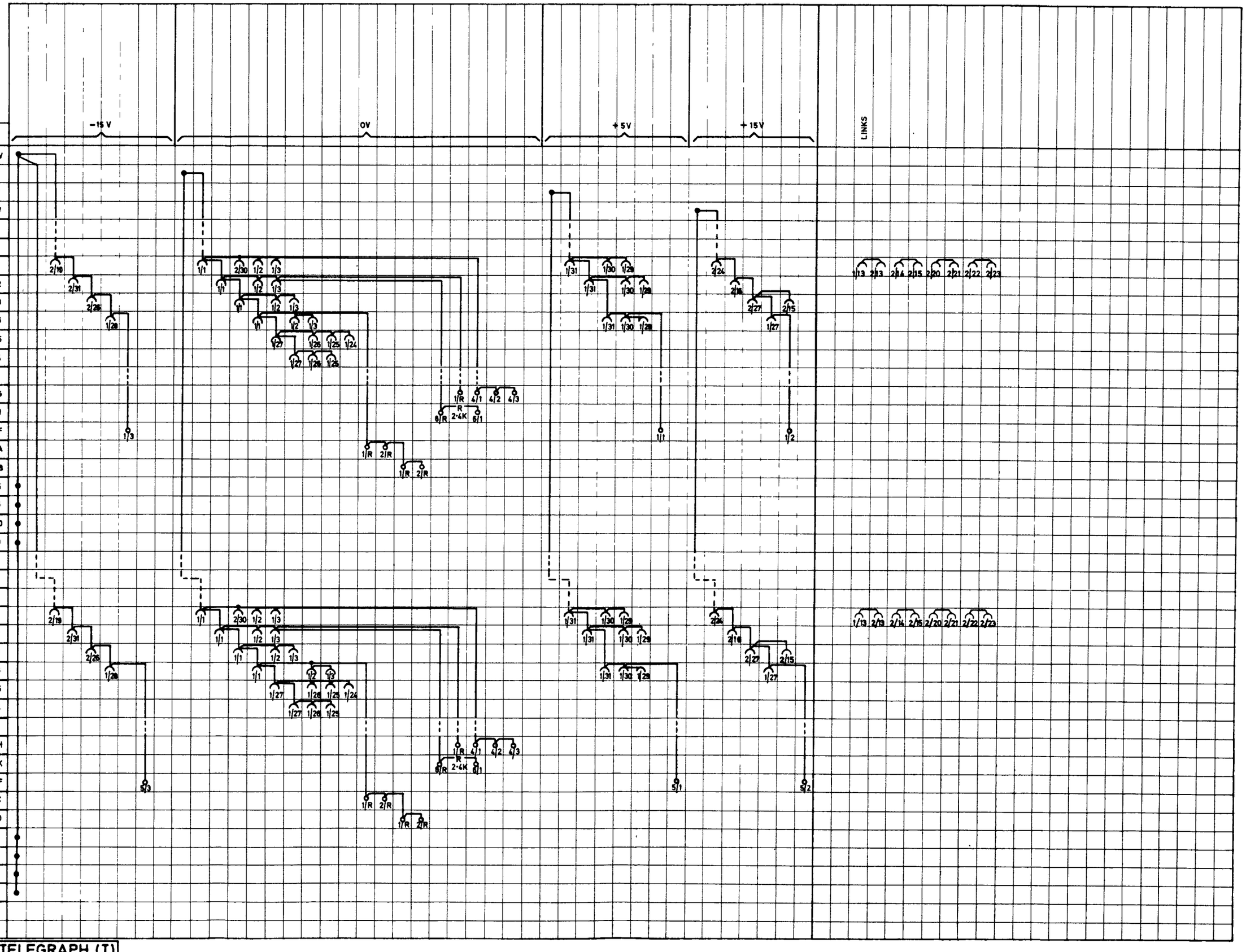
M	TERMINAL TELEGRAPH (T)
	LOD



TERMINAL TELEGRAPH(T)	
SI SHEET 1 OF 3	M

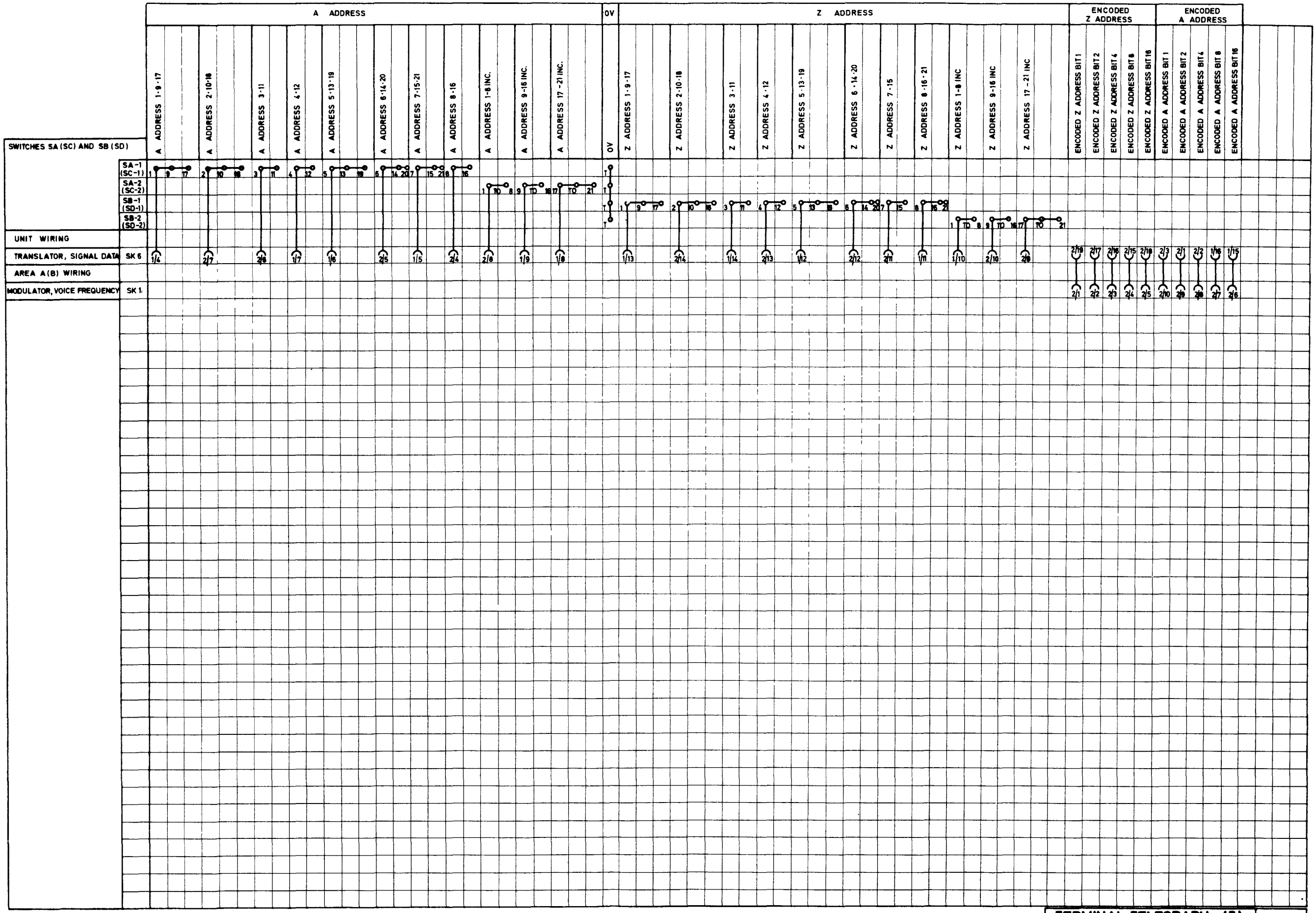
TERMINAL TELEGRAPH (T)

POWER SUPPLY UNIT		−15V
		0V
		+5V
C-1		+15V
	AREA C-1 TO AREA A DISTRIBUTION	
CHANNEL 2		
	MODULATOR VOICE FREQUENCY (PCB1)	SK1
	ELECTRONIC SWITCH (PCB 2)	SK2
	DEMODULATOR ASSESSOR (PCB 3)	SK3
	TRANSLATOR SIGNAL DATA (PCB6)	SK6
	FILTER BANDPASS (PCB 5)	SK5
A	FILTER BANDPASS (PCB 4)	SK4
	AREA A TO AREA 1 DISTRIBUTION	
	MODE SELECTION SWITCH	S G
	BAND WIDTH SWITCH	S J
	FUNCTION SELECT SWITCH	S F
	'A' SELECT SWITCH	S A
	'Z' SELECT SWITCH	S B
	Tx LAMP (OUTER)	LP5
	Rx LAMP (OUTER)	LP6
	'A' LAMP (OUTER)	LP10
	'Z' LAMP (OUTER)	LP9
	AREA C-1 TO AREA B DISTRIBUTION	
CHANNEL 1		
	MODULATOR VOICE FREQUENCY (PCB1)	SK1
	ELECTRONIC SWITCH (PCB 2)	SK2
	DEMODULATOR ASSESSOR (PCB3)	SK3
	TRANSLATOR SIGNAL DATA (PCB6)	SK6
	FILTER BANDPASS (PCB 5)	SK5
B	FILTER BANDPASS (PCB 4)	SK4
	AREA B TO AREA1 DISTRIBUTION	
	MODE SELECTION SWITCH	S H
	BAND WIDTH SWITCH	S K
	FUNCTION SELECT SWITCH	S F
	'A' SELECT SWITCH	S C
	'Z' SELECT SWITCH	S D
	'A' LAMP (OUTER)	LP8
	Rx LAMP (OUTER)	LP4
	Tx LAMP (OUTER)	LP3
	'Z' LAMP (OUTER)	LP7



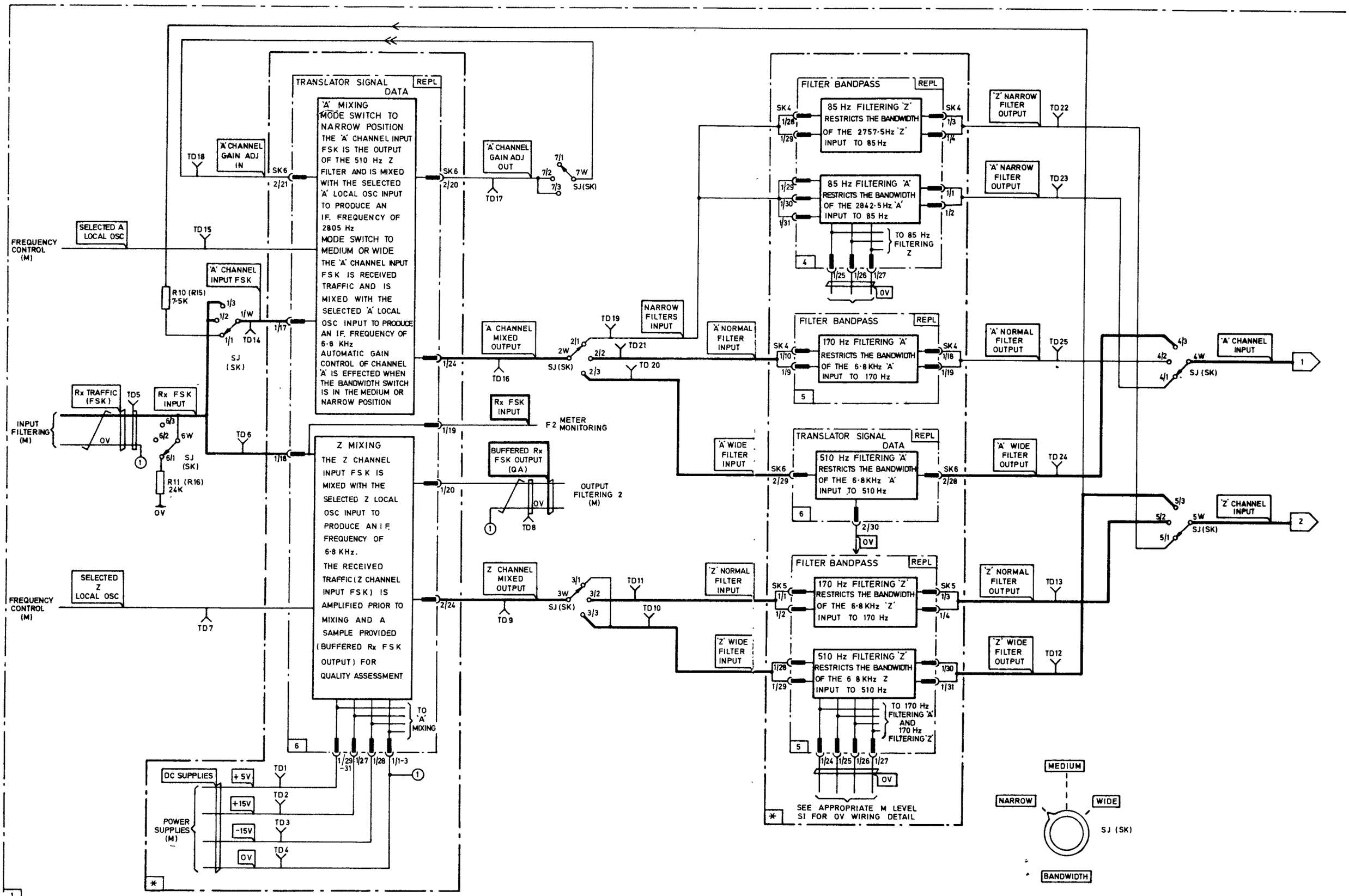
1

M | TERMINAL TELEGRAPH (T) | SI SHEET 2 OF 3



NOTE REFERENCES IN PARENTHESIS ARE UNIQUE TO CHANNEL 1

TERMINAL TELEGRAPH (T)	
SI SHEET 3 OF 3	M



F1	RX TRAFFIC PROCESSING (T)
	FBD + BT SHEET 1 OF 2

DEMODULATOR ASSESSOR REPL

LOGIC CONVERSION

THE 'A' AND 'Z' CHANNEL INPUTS ARE DEMODULATED AND ASSESSED

THE SIGNALS ARE SUMMED AND CONVERTED TO T.T.L. LOGIC LEVELS.

LOGIC CONTENT IS MAINTAINED DURING 'FADE'.

DRIVE 'A' AND 'Z' LAMPS

'A' AND 'Z' CHANNEL SIGNALS PROVIDE DRIVE FOR LAMP ILLUMINATION

1 TD27 SK3 2/1

2 TD26 2/25

3 2/27 2/28 1/1 1/2 1/3

Rx TRAFFIC (LOGIC) — MODE CONTROL (M)

Rx TRAFFIC (LOGIC) TD28 SK3 2/31 — SK2 2/5

A LAMP TD29 LP10(8) 2/3

Z LAMP TD30 LP9(7) 2/6 -15V

DC SUPPLIES +15V -15V 0V

POWER SUPPLIES (M)

ELECTRONIC SWITCH REPL

BUFFER Rx TRAFFIC LOGIC

PROVIDES NORMAL AND INVERTED VERSIONS OF THE INPUT

SK2 2/6 — GATED Rx TRAFFIC (LOGIC) TD31

SK2 2/7 — GATED Rx TRAFFIC LOGIC TD32

NORMAL

INVERT

nc co no SL (SN)

Rx TRAFFIC (CONVERTED) TD33 2/21

2 SK2 1/29 1/30 1/31 — 1/1 1/2 1/3

DC SUPPLIES +5V 0V

POWER SUPPLIES (M)

Tx AND Rx FREQUENCY CONTROL (M) — CLOCK TD34 SK2 2/30

CONTROL (M) — Rx ENABLE TD35 — CONTROL INHIBIT Rx TD36 — MUTE TD37

GATE Rx TRAFFIC

PROVIDED THAT THE LOGIC LEVELS Rx ENABLE CONTROL INHIBIT Rx AND MUTE ARE CORRECT THE Rx TRAFFIC (CONVERTED) SIGNAL WILL GATE OUT THE 1KHz TONE AS Rx TRAFFIC (TELEGRAPH)

SK2 2/25 — Rx TRAFFIC (TELEGRAPH) TD38 — F2 METER MONITORING

SK2 2/26 — 0V — OUTPUT FILTERING (1) (M)

2/16 2/31

DC SUPPLIES +15V -15V

POWER SUPPLIES (M)

NOTE

1. THE CIRCUIT REFERENCES SHOWN IN BRACKETS ARE APPLICABLE TO CHANNEL 1.
2. AREAS MARKED THUS * DENOTE AREA B CHANNEL 1 OR AREA A CHANNEL 2.

RX TRAFFIC PROCESSING (T) F1

FBD + BT SHEET 2 OF 2

	INPUTS				INPUT	BW SWITCH	INPUT	TRANSLATOR SIGNAL DATA		BW SWITCH	FILTER B'PASS	FILTER B'PASS	B.W SWITCH & RESISTOR	INPUT	TRANSLATOR SIGNAL DATA	BW SWITCH	BW SWITCH	FILTER B'PASS	FILTER B'PASS	TRANSLATOR SIGNAL DATA	FILTER B'PASS	BW SWITCH	BW SWITCH	DEMODULATOR ASSESSOR			ELECTRONIC SWITCH		NORMAL INVERT SW	INPUTS				OUTPUTS EL SWITCH			
								REPL			REPL	REPL			REPL			REPL	REPL	REPL	REPL			REPL			REPL							REPL			
						1		1A6 (1B6)		1	1A5(1B5)	1A5(1B5)	1		1A6 (1B6)	1	1	1A4(1B4)	1A4 (1B4)	1A6 (1B6)	1A5 (1B5)	1	1	1A3 (1B3)			1A2 (1B2)		1					1A2 (1B2)			
	+5V	+15V	−15V	0V	Rx TRAFFIC (FSK)	SJ (K) 6 Rx F.SK. INPUT	SELECTED 'Z' LOCAL OSC	'Z' MIXING	BUFFERED Rx FSK OUTPUT (QA)	'Z' CHANNEL MIXED OUTPUT	SJ (K) 3	'Z' WIDE FILTER INPUT	'Z' NORMAL FILTER INPUT	510 Hz FILTERING Z	'Z' WIDE FILTER OUTPUT	170 Hz FILTERING Z	'Z' NORMAL FILTER OUTPUT	RESISTOR 7·5 K	SJ (K) 1	'A' CHANNEL INPUT FSK	SELECTED 'A' LOCAL OSC	'A' MIXING	'A' CHANNEL MIXED OUTPUT	'A' CHANNEL GAIN ADJ OUT	SJ (K) 7	'A' CHANNEL GAIN ADJ IN	SJ (K) 2	NARROW FILTER INPUTS	'A' WIDE FILTER INPUT	'A' NORMAL FILTER INPUT	85 Hz FILTERING 'Z'	'Z' NARROW FILTER OUTPUT	85 Hz FILTERING 'A'	'A' NARROW FILTER OUTPUT	510 Hz FILTERING 'A'	'A' WIDE FILTER OUTPUT	170 Hz FILTERING 'A'	'A' NORMAL FILTER OUTPUT	SJ (K) 5	'Z' CHANNEL INPUT	SJ (K) 4	'A' CHANNEL INPUT	LOGIC CONVERSION	Rx TRAFFIC (LOGIC)	DRIVE 'A' LAMP	DRIVE 'Z' LAMP	BUFFER Rx TRAFFIC LOGIC	GATED Rx TRAFFIC (LOGIC)	GATED Rx TRAFFIC (LOGIC)	SL (SN)	Rx TRAFFIC (CONVERTED)	CLOCK	Rx ENABLE	CONTROL INHIBIT Rx	MUTE	GATE Rx TRAFFIC	Rx TRAFFIC TELEGRAPH	BUFFERED Rx FSK OUTPUT (QA)	Rx TRAFFIC LOGIC
TEST DATA No.	1	2	3	4	5	6	7	8		9	10	11	12	13		14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	8	28
	MON	MON	MON	PCD	MON		A										A																		A	PCD	IND	IND			

SET BANDWIDTH SWITCH TO MEDIUM

SET BANDWIDTH SWITCH TO WIDE

SET BANDWIDTH SWITCH TO NARROW

LOCATION CODES					
	*1	*2	*3	*4	*5
CHANNEL 1	1B2	1B3	1B4	1B5	1B6
CHANNEL 2	1A2	1A3	1A4	1A5	1A6

NOTE THE CIRCUIT REFERENCES IN PARENTHESIS ARE APPLICABLE TO CHANNEL 1.

F1 RX TRAFFIC PROCESSING (T)
MDC

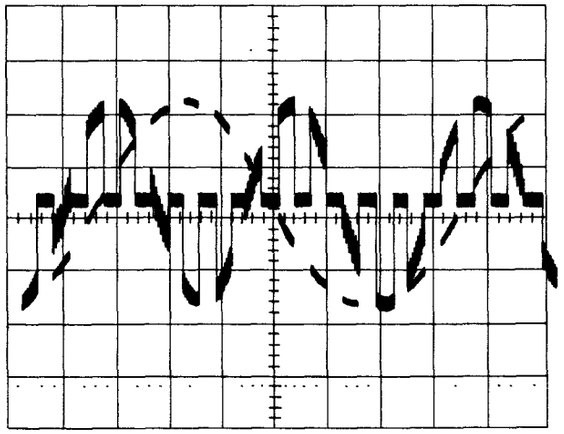
TD	SIGNAL TITLE	MAIN MEASURING POINTS				ALTERNATIVE MEASURING POINTS				TEST EQUIPMENT		PROCEDURES	INDICATIONS
		AVAIL ACCESS	AT	WITH RESPECT TO	LOC	AVAIL ACCESS	AT	WITH RESPECT TO	LOC	IDENTITY	SETTING		
1	+5V	MON	VERIFIED AT MASTER LEVEL										
2	+15V	MON	VERIFIED AT MASTER LEVEL										
3	-15V	MON	VERIFIED AT MASTER LEVEL										
4	0V	PCD	VERIFIED AT MASTER LEVEL										
5	Rx TRAFFIC (F·S·K)	MON	VERIFIED AT MASTER LEVEL										
6	Rx F·S·K INPUT	MON	FRONT PANEL METER		1							SET CHANNEL SWITCH TO 1 OR 2 AS REQUIRED SET FUNCTION SWITCH TO Rx F S K	METER READING FLUCTUATES (WITH Rx TRAFFIC LEVEL) BETWEEN 20 – 80% FSD
						PCD						SIGNAL PRESENT IF TD8 IS VALID.	
7	SELECTED 'Z' LOCAL OSC	A	VERIFIED AT MASTER LEVEL										
8	BUFFERED Rx F S K OUTPUT (QA)	PCD											VERIFIED AT M LEVEL
9	'Z' CHANNEL MIXED OUTPUT	A	TP5	TP12	#5					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'A'
10	WIDE 'Z' FILTER INPUT	A	SJ 3/3 (SK 3/3)	TP12	#5					OSCILLOSCOPE (ITEM 3)			AS TD 9
11	NORMAL 'Z' FILTER INPUT	A	SJ 3/2 (SK3/2)	TP12	#5					OSCILLOSCOPE (ITEM 3)			AS TD 9
12	'Z' WIDE FILTER OUTPUT	A	SJ 5/3 (SK 5/3)	TP12	#5					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'B'
13	'Z' NORMAL FILTER OUTPUT	A	SJ 5/2 (SK 5/2)	TP12	#5					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'C'
14	'A' CHANNEL INPUT F·S·K	A	TP11	TP12	#5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO MEDIUM OR WIDE	SEE WAVEFORM 'A' AT M LEVEL
		A	TP11	TP12	#5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO NARROW	NOMINAL 6·8KHz TONE AMPLITUDE 0·2V pk-pk
15	SELECTED 'A' LOCAL OSC	A	VERIFIED AT MASTER LEVEL										
16	'A' CHANNEL MIXED OUTPUT	A	TP6	TP12	#5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO WIDE	SEE WAVEFORM 'A'
		A	TP6	TP12	#5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO NARROW	SEE WAVEFORM 'E' TOP TRACE
17	'A' CHANNEL GAIN ADJUST OUT.	A	TP7	TP12	#5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO MEDIUM OR WIDE SET BANDWIDTH SWITCH TO WIDE	AMPLIFIED VERSION OF TD14 WAVEFORM 'E' BOTTOM TRACE
18	'A' CHANNEL GAIN ADJUST IN	A	SJ-7W (SK-7W)	TP12	#5					OSCILLOSCOPE (ITEM 3)			AS TD 17
19	NARROW FILTERS INPUT	A	SJ 2/1 (SK 2/1)	TP12	#5					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'E' TOP TRACE
20	WIDE 'A' FILTER INPUT	A	SJ 2/3 (SK2/3)	TP12	#5					OSCILLOSCOPE (ITEM 3)			AS TD16
21	NORMAL 'A' FILTER INPUT	A	SJ 2/2 (SK2/2)	TP12	#5					OSCILLOSCOPE (ITEM 3)			AS TD16
22	'Z' NARROW FILTER OUTPUT	A	SJ 5/1 (SK5/1)	TP13	#2					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'D'
23	'A' NARROW FILTER OUTPUT	A	SJ 4/1 (SK 4/1)	TP13	#2					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'D'
24	'A' WIDE FILTER OUTPUT	A	SJ 4/3 (SK4/3)	TP13	#2					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'B'
25	'A' NORMAL FILTER OUTPUT	A	SJ 4/2 (SK 4/2)	TP13	#2					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'C'

	LOCATION CODES				
	#1	#2	#3	#4	#5
CHANNEL 1	1B2	1B3	1B4	1B5	1B6
CHANNEL 2	1A2	1A3	1A4	1A5	1A6

Rx TRAFFIC PROCESSING (T)	F1
TDC SHEET 1 OF 3	

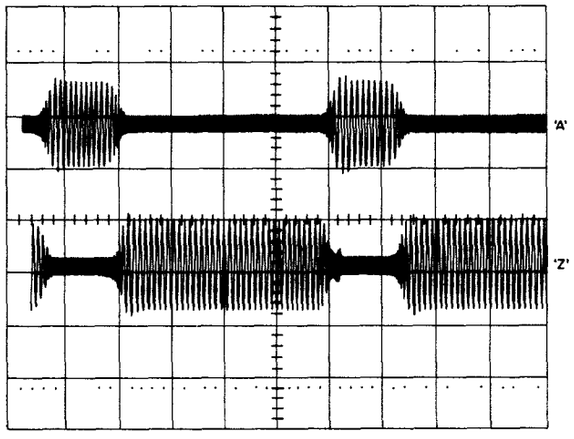
TD	SIGNAL TITLE	MAIN MEASURING POINTS				ALTERNATIVE MEASURING POINTS				TEST EQUIPMENT		PROCEDURES	INDICATIONS
		AVAIL ACCESS	AT	WITH RESPECT TO	LOC	AVAIL ACCESS	AT	WITH RESPECT TO	LOC	IDENTITY	SETTING		
26	'Z' CHANNEL INPUT	A	TP9	TP13	*2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO MEDIUM	AS TD13
		A	TP9	TP13	*2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO WIDE	AS TD12
		A	TP9	TP13	*2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO NARROW	AS TD22
27	'A' CHANNEL INPUT	A	TP9	TP13	*2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO MEDIUM	AS TD25
		A	TP9	TP13	*2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO WIDE	AS TD24
		A	TP9	TP13	*2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO NARROW	AS TD22
28	Rx TRAFFIC (LOGIC)	A	TP1	TP13	*2					LOGIC PROBE	COUNT		H21
29	'A' LAMP	IND	FRONT PANEL										'A' LAMP ILLUMINATES WITH 'A' CHANNEL TRAFFIC
30	'Z' LAMP	IND	FRONT PANEL										'Z' LAMP ILLUMINATES WITH 'Z' CHANNEL TRAFFIC
31	GATED Rx TRAFFIC (LOGIC)	A	SL N/C (SN N/C)		*1					LOGIC PROBE	COUNT		H21
32	$\overline{\text{GATED Rx TRAFFIC (LOGIC)}}$	A	SL N/O (SN N/O)		*1					LOGIC PROBE	COUNT		H21
33	Rx TRAFFIC (CONVERTED)	A	SL C/O (SN C/O)		*1					LOGIC PROBE	COUNT	NORMAL/INVERT SWITCH IN EITHER POSITION	H21
34	CLOCK	A	VERIFIED AT MASTER LEVEL										
35	Rx ENABLE	PCD	VERIFIED AT MASTER LEVEL										
36	CONTROL INHIBIT Rx	IND	VERIFIED AT MASTER LEVEL										
37	MUTE	IND	VERIFIED AT MASTER LEVEL										
38	Rx TRAFFIC (TELEGRAPH)	MON	FRONT PANEL METER									SET CHANNEL SWITCH TO 1 OR 2 AS REQUIRED AND FUNCTION SWITCH TO Rx-1KHz	METER READING FLUCTUATES (WITH Rx TRAFFIC) BETWEEN 20% AND 80% FSD

WAVEFORM 'A'
AMPLITUDE 2.0V/DIV
TIMEBASE TYPICALLY 200µS/DIV
INTERNAL TRIGGER



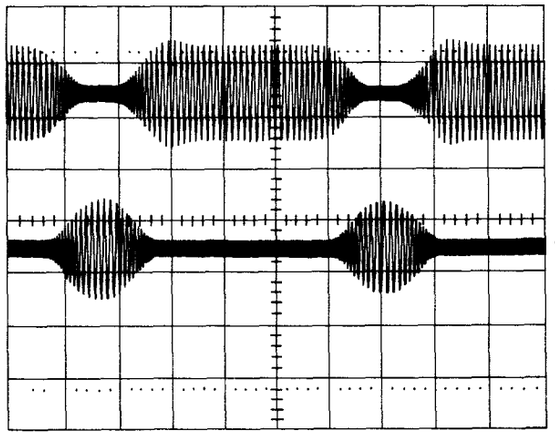
THIS WAVEFORM ILLUSTRATES THE TWO COMPONENT FREQUENCIES OF THE RX FSK BEING CHOPPED BY THE SELECTED A OR Z FREQUENCY. THIS WAVEFORM IS TYPICAL OF THE A OR Z CHANNEL MIXED OUTPUTS

WAVEFORM 'B'
AMPLITUDE 500 mV/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER



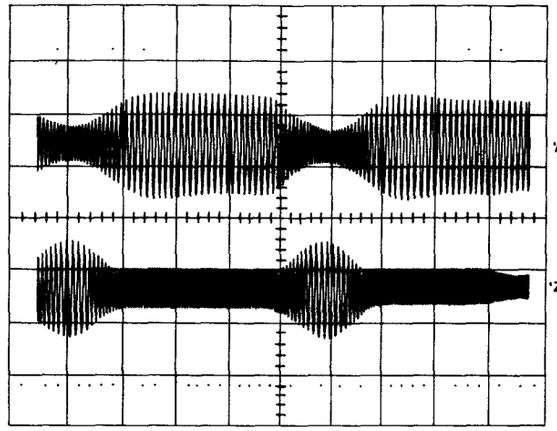
THIS WAVEFORM ILLUSTRATES THE RESPONSE OF THE A AND Z WIDE FILTERS TO THE 6.8KHz IF NOTE THE SHARP RISE IN THE LEADING EDGE OF THE ENVELOPE. THIS TYPIFIES THE RESPONSE OF A WIDE FILTER. WHEN TWO BEAMS ARE USED, THE MARK/SPACE RELATIONSHIP BETWEEN THE A AND Z CHANNELS CAN BE CLEARLY DEFINED.

WAVEFORM 'C'
AMPLITUDE 500mV/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER



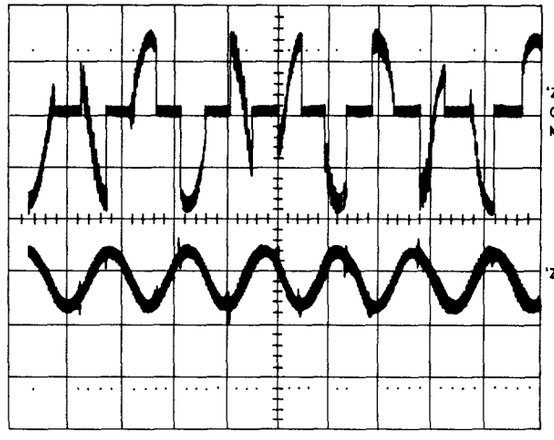
THIS WAVEFORM ILLUSTRATES THE RESPONSE OF THE A AND Z NORMAL FILTERS TO THE 6.8KHz I.F. TWO BEAMS MAY BE USED TO DISPLAY THE MARK SPACE RELATIONSHIP BETWEEN 'A' AND 'Z' CHANNELS

WAVEFORM 'D'
AMPLITUDE 500mV/DIV
TIMEBASE 10 mS/DIV
INTERNAL TRIGGER



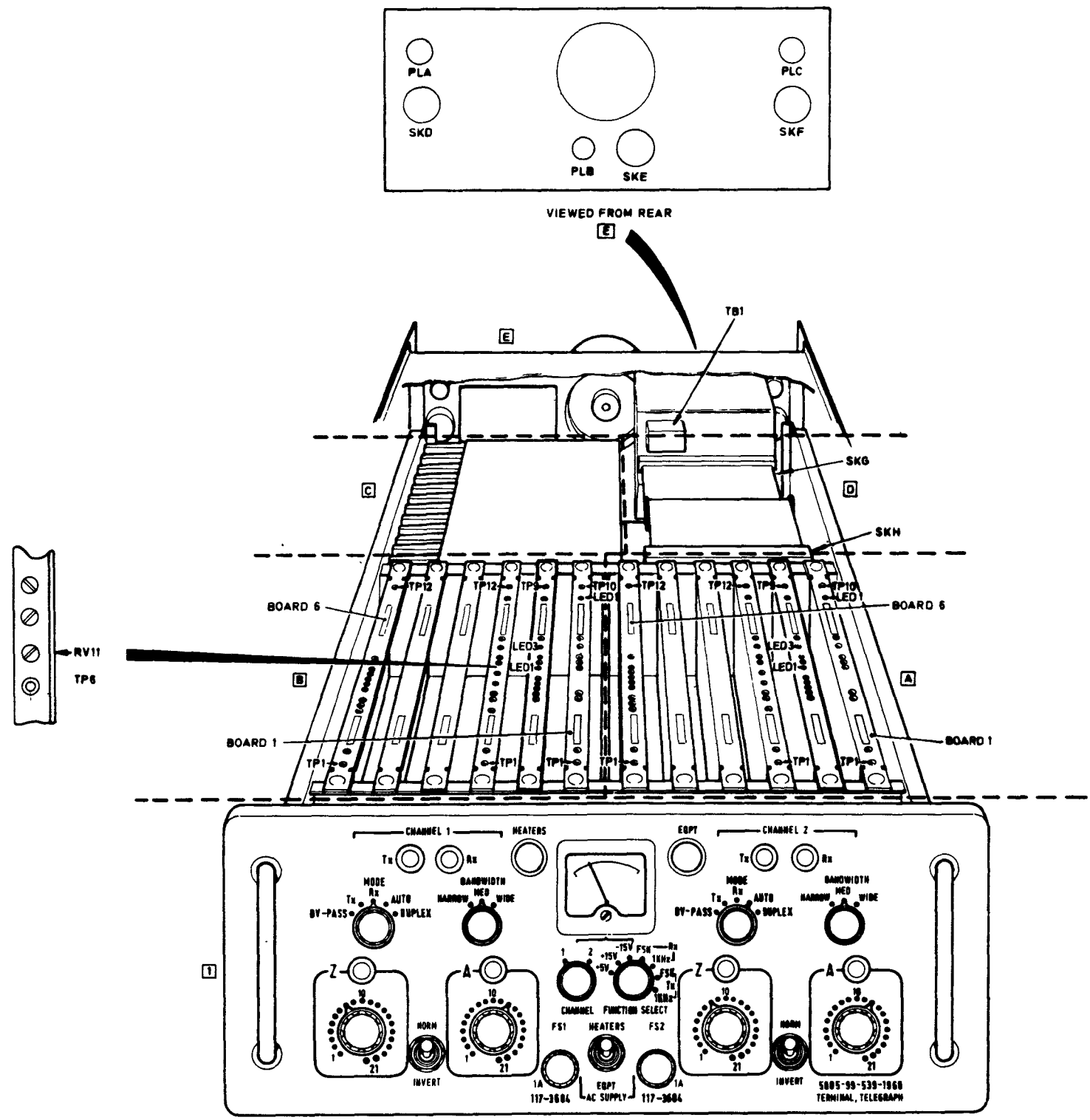
THIS WAVEFORM ILLUSTRATES THE RESPONSE OF THE 'A' AND 'Z' NARROW FILTERS TO THE 2805Hz I.F. TWO BEAMS MAY BE USED TO DISPLAY THE MARK SPACE RELATIONSHIP BETWEEN THE 'A' AND 'Z' CHANNELS

WAVEFORM 'E'
AMPLITUDE 2V/DIV
TIMEBASE TYPICALLY 100µS/DIV
INTERNAL TRIGGER



THIS WAVEFORM ILLUSTRATES THE INPUT AND OUTPUT OF THE 'A' CHANNEL MIXING IN THE 'NARROW' MODE

Rx TRAFFIC PROCESSING (T)	F1
TDC SHEET 3 OF 3	



Rx TRAFFIC PROCESSING (T)	F1
LOD	

CHANNEL 2

Tx TRAFFIC (TELEGRAPH)
Tx FSK INPUT
Rx TRAFFIC (TELEGRAPH)
Rx FSK INPUT
M
F1
TD2
TD3
TD4
TD5
1/6
1/7
1/5
1/4
SF 1/W
1/3
1/2
1/1
−15V
+15V
TD6
TD7
CHANNEL 2 D.C. SUPPLIES
M (POWER SUPPLIES)
+5V
0V
TD8
TD1
4
2
1
3
2/7
2/6
2/5
SF 2/W
2/4
2/3
2/2
2/1
METER AMP IN
SELECTED +5V
SELECTED +15V
SELECTED −15V
ELECTRONIC SWITCH
REPL
RECTIFICATION AND AMPLIFICATION. SELECTED CHANNEL 2 SIGNALS ARE RECTIFIED AND AMPLIFIED PRIOR TO BEING APPLIED AS MONITORING SIGNALS TO THE FRONT-PANEL METER
SK2 2/29
SK2 2/28
2
SK2
2/16
1/29
2/31
1/1
1
2
3
4
A
METER AMP OUT
TD9
3/6
3/7
3/5
3/4
SF 3/W
3/3
3/2
3/1
TD13
CHL 2 METER INPUT
R7
10K
TD12
ATTENUATED +5V
R8
30K
TD11
ATTENUATED +15V
4/6
4/7
4/5
4/4
SF 4/W
4/3
4/2
4/1
R9
30K
TD10
ATTENUATED −15V
CHANNEL SE
1
2
1/2
SE 1/W
SELECTED METER INPUT
1/1
TD14
M
METER INDICATION
2/2
SE 2/W
2/1

CHANNEL 1

Tx TRAFFIC (TELEGRAPH)
Tx FSK INPUT
Rx TRAFFIC (TELEGRAPH)
Rx FSK INPUT
M
F1
TD2
TD3
TD4
TD5
5/6
5/7
5/5
5/4
SF 5/W
5/3
5/2
5/1
−15V
+15V
TD6
TD7
CHANNEL 1 D.C. SUPPLIES
M (POWER SUPPLIES)
+5V
0V
TD8
TD1
8
6
5
7
6/7
6/6
6/5
SF 6/W
6/4
6/3
6/2
6/1
METER AMP IN
SELECTED +5V
SELECTED +15V
SELECTED −15V
ELECTRONIC SWITCH
REPL
RECTIFICATION AND AMPLIFICATION. SELECTED CHANNEL 1 SIGNALS ARE RECTIFIED AND AMPLIFIED PRIOR TO BEING APPLIED AS MONITORING SIGNALS TO THE FRONT-PANEL METER.
SK2 2/29
SK2 2/28
2
SK2
2/16
1/29
2/31
1/1
5
6
7
8
B
METER AMP OUT
TD9
7/6
7/7
7/5
7/4
SF 7/W
7/3
7/2
7/1
TD13
CHL 1 METER INPUT
R12
10K
TD12
ATTENUATED +5V
R13
30K
TD11
ATTENUATED +15V
8/6
8/7
8/5
8/4
SF 8/W
8/3
8/2
8/1
R14
30K
TD10
ATTENUATED −15V
FUNCTION SELECT
SF
−15V
FSK
Rx
+15V
1KHz
+5V
FSK
Tx
1KHz

1

F2 | METER MONITORING (T)
FBD + BT

	INPUTS								FUNCTION SELECT SWITCH	ELEC SWITCH	R9 (R14)	R8 (R13)	R7 (R12)	FUNCTION SELECT SWITCH	CHL S/W	OUTPUT
										REPL						
									1	1A2(1B2)	1	1	1	1	1	1
	0V	Tx TRAFFIC (TELEGRAPH)	Tx FSK INPUT	Rx TRAFFIC (TELEGRAPH)	Rx FSK INPUT	-15V	+15V	+5V	SF-1 (SF-5)	SF-2 (SF-6)	RECTIFICATION & AMPLIFICATION	METER AMP OUTPUT	RESISTOR (-15V)	ATTENUATED -15V	RESISTOR (+15V)	ATTENUATED +15V	RESISTOR (+5V)	ATTENUATED +5V	SF-3 (SF-7) AND SF-4 (SF-8)	CHL 2 (CHL 1) METER INPUT	SE SET TO CHL 2 (CHL 1)	METER	METER INDICATION
TEST DATA No.	1	2	3	4	5	6	7	8				9		10		11		12		13			14
	PCD	A	A	A	A	A	A	A															
SET FUNCTION SELECT SWITCH TO +5V																	PCD		PCD			MON	
SET FUNCTION SELECT SWITCH TO +15V															PCD				PCD			MON	
SET FUNCTION SELECT SWITCH TO -15V														PCD					PCD			MON	
SET FUNCTION SELECT SWITCH TO Rx - FSK AND MODE SWITCH TO Rx.											PCD								PCD			MON	
SET FUNCTION SELECT SWITCH TO Rx -1KHz AND MODE SWITCH TO Rx.											PCD								PCD			MON	
SET FUNCTION SELECT SWITCH TO Tx -FSK AND MODE SWITCH TO Tx.											PCD								PCD			MON	
SET FUNCTION SELECT SWITCH TO Tx -1KHz AND MODE SWITCH TO Tx.											PCD								PCD			MON	
1. SET CHANNEL SWITCH TO CHANNEL 1 OR 2 AS REQUIRED.																							

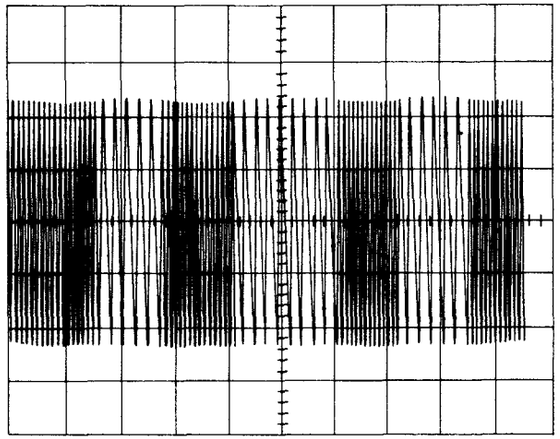
NOTE REFERENCES IN PARENTHESES ARE UNIQUE TO CHANNEL 1

METER MONITORING (T)
MDC
F2

TD	SIGNAL TITLE	MAIN MEASURING POINTS				ALTERNATIVE MEASURING POINTS				TEST EQUIPMENT		PROCEDURES	INDICATIONS
		AVAIL ACCESS	AT	WITH RESPECT TO	LOC	AVAIL ACCESS	AT	WITH RESPECT TO	LOC	IDENTITY	SETTING		
1	0V	PCD										VALID IF TD2 TO TD8 IS VALID	
2	Tx TRAFFIC (TELEGRAPH)	A	SF1/7 (SF5/7)	SF4/7 (SF8/7)						OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM D
3	Tx FSK INPUT	A	SF1/6 (SF5/6)	SF4/6 (SF8/6)						OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM A, B & C
4	Rx TRAFFIC (TELEGRAPH)	A	SF1/5 (SF5/5)	SF4/5 (SF8/5)						OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM D
5	Rx FSK INPUT	A	SF1/4 (SF5/4)	SF4/4 (SF8/4)						OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM A, B & C
6	−15V	A	SF1/3 (SF5/3)	SF3/3 (SF7/3)						MULTIMETER (ITEM 1)	30V DC RANGE		−15V ±0·75V
7	+15V	A	SF1/2 (SF5/2)	SF4/2 (SF8/2)						MULTIMETER (ITEM 1)	30V DC RANGE		+15V ±0·75V
8	+5V	A	SF1/1 (SF5/1)	SF4/1 (SF8/1)						MULTIMETER (ITEM 1)	30V DC RANGE		+5V ±0·25V
9	METER AMP OUTPUT	PCD										SIGNAL PRESENT IF TD14 IS VALID	
10	ATTENUATED −15V	PCD										SIGNAL PRESENT IF TD14 IS VALID	
11	ATTENUATED +15V	PCD										SIGNAL PRESENT IF TD14 IS VALID	
12	ATTENUATED +5V	PCD										SIGNAL PRESENT IF TD14 IS VALID	
13	CHL2 (CHL1) METER INPUT	PCD										SIGNAL PRESENT IF TD14 IS VALID	
14	METER INDICATION	MON	METER ON FRONT PANEL									FUNCTION SWITCH SET TO +5V	METER SCALE 10V FSD AND READS 50% ±2DIV
												FUNCTION SWITCH SET TO +15V	METER SCALE 30V FSD AND READS 50%±2DIV
												FUNCTION SWITCH SET TO −15V	METER SCALE −30V FSD AND READS 50% ±2DIV
												FUNCTION SWITCH SET TO Rx−FSK	METER READING BETWEEN 20% & 80% FSD WITH INCOMING TRAFFIC LEVEL
												FUNCTION SWITCH SET TO Rx−1kHz	METER READS 80%±3DIV = SPACE/A 20%±2DIV = MARK/Z
												FUNCTION SWITCH SET TO Tx−FSK	METER READS 80% FOR 0dBm 20% FSD FOR ZERO
												FUNCTION SWITCH SET TO Tx−1kHz	METER READS 80% ±3DIV = SPACE/A 20% ±2DIV = MARK/Z
												NOTE : REFERENCES IN PARENTHESIS ARE UNIQUE TO CHANNEL 1	

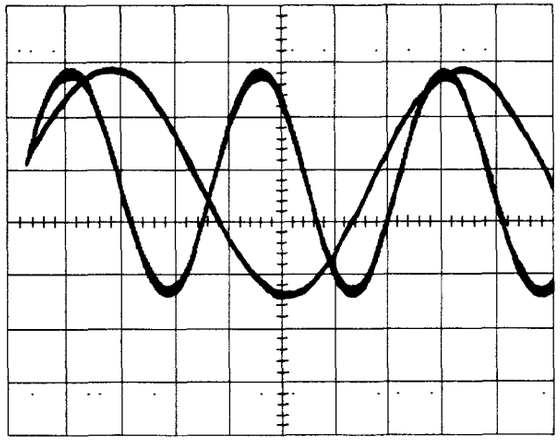
F2	METER MONITORING (T)
	TDC SHEET 1 OF 2

WAVEFORM 'A'
AMPLITUDE 0.5V/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER



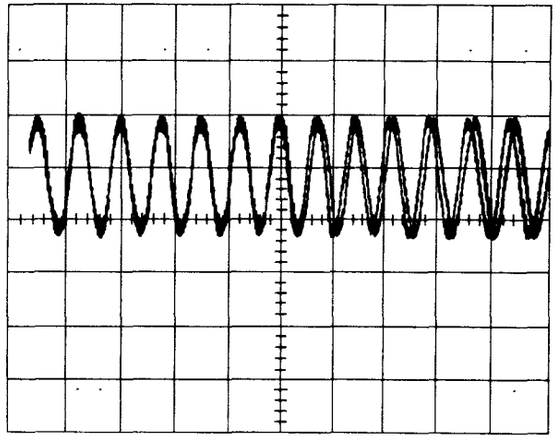
THIS WAVEFORM ILLUSTRATES A TYPICAL FSK SIGNAL AT 0dBM. IN THIS CASE THE TWO FREQUENCIES ARE CLEARLY DISTINGUISHABLE. IN THE EVENT THAT THIS IS NOT THE CASE THEN WAVEFORMS 'B' AND 'C' SHOULD BE REFERRED TO
N.B WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

WAVEFORM 'B'
AMPLITUDE 0.5V/DIV
TIMEBASE 200µS/DIV
INTERNAL TRIGGER



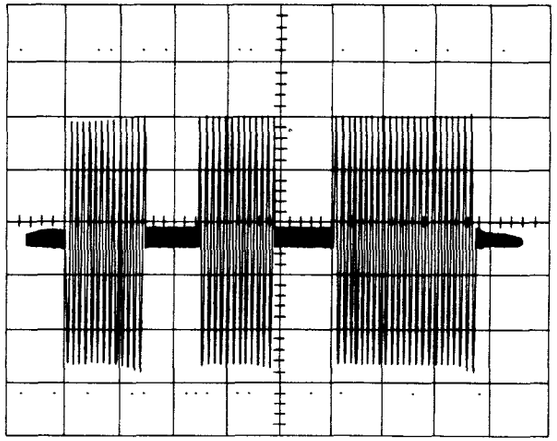
THIS WAVEFORM ILLUSTRATES THE TWO COMPONENT FREQUENCIES OF A TYPICAL FSK SIGNAL WITH A RELATIVELY WIDE FREQUENCY SHIFT. THE TWO FREQUENCIES MAY BE CALCULATED BY OBSERVING THIS WAVEFORM
N.B. WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

WAVEFORM 'C'
AMPLITUDE 1.0V/DIV
TIMEBASE 200µS/DIV
INTERNAL TRIGGER



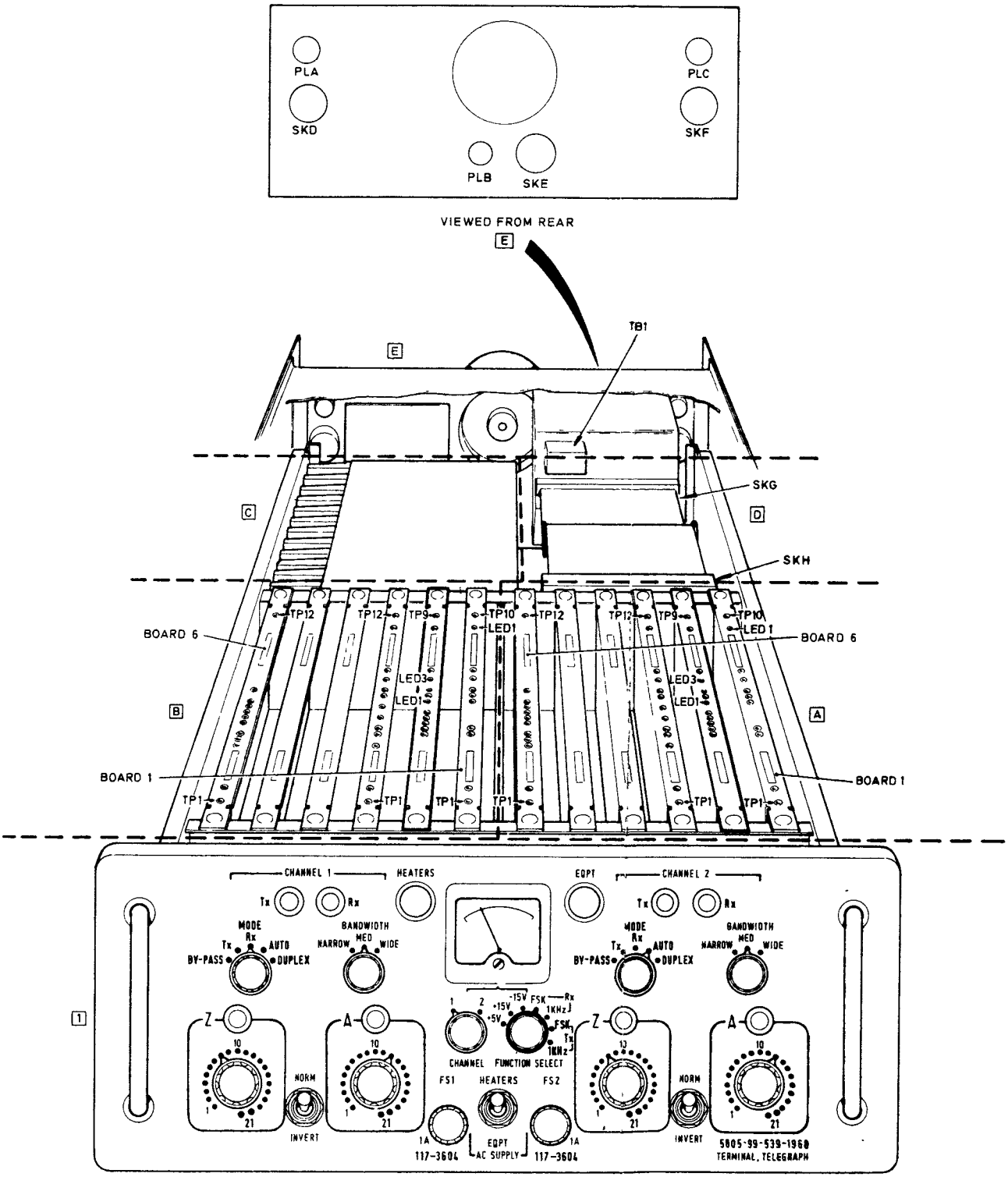
THIS WAVEFORM ILLUSTRATES THE TWO COMPONENT FREQUENCIES OF AN FSK SIGNAL WITH A NARROW FREQUENCY SHIFT
N.B WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

WAVEFORM 'D'
AMPLITUDE 0.5V/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER



THIS WAVEFORM ILLUSTRATES A 1KHz ON/OFF SIGNAL. THE MARK/SPACE RELATIONSHIP SHOULD BE CLEARLY OBSERVABLE
N.B. WHEN OBSERVING WAVEFORM AT SKD (SKF) AMPLITUDE WILL BE HALVED

METER MONITORING (T)	F2
TDC SHEET 2 OF 2	



F2	METER MONITORING (T)
	LOD

PART 3A

CHAPTER 4

TECHNICAL DESCRIPTION: TERMINAL TELEGRAPH (B)

CONTENTS

TERMINAL TELEGRAPH (BROADCAST)

REPL
FILTER
Rx TRAFFIC (FSK)
PLC
E
Scr
F
OV
INPUT FILTERING (1)
TD18
SKG
1/39
1/38
SKH
Rx TRAFFIC (FSK)
TD19
Rx TRAFFIC (TELEGRAPH)
TD25
1/35
1/34
BUFFERED Rx FSK OUTPUT (QA)
TD20
1/37
1/36
FILTER
OUTPUT FILTERING (1)
OUTPUT FILTERING (2)
Rx TRAFFIC (TELEGRAPH)
Rx TRAFFIC (QA)
TD26
TD27
SKF
SKE
22
23
24
38
39
40
17
18
33
34
B
A
C
T
OV

CHANNEL 1 FUNCTIONS WHICH ARE IDENTICAL TO THOSE OF CHANNEL 2 HAVE NOT BEEN REPEATED.

115V 1Ø (HEATERS)
ANTI-CONDENSATION HEATERS
HEAT OUTPUT
TD12
LP 1
R6
TD11
HEATERS
H 1
H 2
H 3
H 4

DRAWER CLOSED
TD2
PLB
TD1
B
S1
c/o
no
nc
SKG
SKH
FS1
3A
TD3
1/1
1/2
1/3
HEATERS
SM
EQPT
C
S2
1/40
1/41
FS2
2/1
TD4
1/20
115V1Ø

POWER UNIT
TD5
POWER SUPPLIES PRODUCES STABILISED +15V +5V AND -15V DC SUPPLIES FROM A 115V 1Ø INPUT
D.C. SUPPLIES (SEE NOTE 5)
+15V
+5V
-15V
OV
TD6
TD7
TD8
TD9
4
R5
LP 2
EQPT
115V 1Ø EQPT
C1

E
SKH
SKG
1/21
1/22
COOLING FAN
TB
1/1
1/2
3
M
COOLING AIR
TD10

1

CHANNEL 2 SHEET 2
DEMODULATED CHANNEL 2 TRAFFIC

Rx TRAFFIC (TELEGRAPH) 1
Rx FSK INPUT 2
CHL 1 DC SUPPLIES 3

NOTE 1. SHEET 2 ILLUSTRATES THE COMPLETE FUNCTIONAL BREAKDOWN OF CHANNEL 2 AND ALSO SHOWS THE MONITORING FUNCTION (F2) WHICH IS COMMON TO BOTH CHANNELS.
SHEET 1 ONLY ILLUSTRATES THE CHANNEL 1 FUNCTIONS WHICH DIFFER FROM THOSE OF CHANNEL 2. A POWER SUPPLY FUNCTION COMMON TO CHANNEL 1 AND CHANNEL 2 IS ALSO SHOWN ON THIS SHEET

NOTE 2. FOR DETAIL WIRING SEE S1 SHEET 2

NOTE 3. COMPONENT IDENTIFICATION IN PARENTHESIS RELATE TO CHANNEL 1.

NOTE 4. AREA MARKED THUS * DENOTES AREA A (CHANNEL 2) OR AREA B (CHANNEL 1)

NOTE 5 FOR DETAIL WIRING SEE S1. SHEET 1

M	TERMINAL TELEGRAPH (B)
	FBD + BT SHEET 1 OF 2

REPL
Rx TRAFFIC (FSK)
FILTER
PLA
E
Scr
F
OV
INPUT FILTERING (1)
TD18
SKG
SKH
1/4
1/5
TD19
Rx TRAFFIC (FSK)
Rx TRAFFIC PROCESSING
F1
CONVERTS THE 2-TONE VOICE FREQUENCY INPUT SIGNAL (Rx TRAFFIC FSK) INTO A 1KHz SINGLE-TONE ON-OFF OUTPUT SIGNAL (Rx TRAFFIC TELEGRAPH)
TD25
Rx TRAFFIC (TELEGRAPH)
TD20
BUFFERED Rx FSK OUTPUT (QA)
REPL
FILTER
OUTPUT FILTERING (1)
OUTPUT FILTERING (2)
Rx TRAFFIC (TELEGRAPH)
Rx TRAFFIC (QA)
TD26
TD27
SKD
SKE
FREQUENCY SELECTION
SA-1 (SC-1)
SA-2 (SC-2)
SB-1 (SD-1)
SB-2 (SD-2)
A
Z
TD13
TD14
A ADDRESS (SEE NOTE 2)
Z ADDRESS (SEE NOTE 2)
TRANSLATOR SIGNAL DATA
REPL
SK6
FREQUENCY CONTROL CONVERTS THE 'A' AND 'Z' SWITCH INPUTS TO B C D FORM WHICH IS EMPLOYED TO PRODUCE 'A' AND 'Z' LOCAL OSCILLATOR FREQUENCIES FOR THE Rx.
TD16
TD17
SELECTED A LOCAL OSC
SELECTED Z LOCAL OSC
CLOCK
TD15
ELECTRONIC SWITCH
REPL
SK2
MODE CONTROL
CHECKS THAT THE LEVEL OF THE INCOMING Rx FSK SIGNAL IS OF ADEQUATE LEVEL.
DETERMINES WHETHER THE Rx TRAFFIC (LOGIC) SIGNAL IS VALID (i.e NOT NOISE)
GENERATES THE NECESSARY CONTROL SIGNALS TO ENABLE THE Rx PROCESSING FUNCTION.
TD24
MUTE
DEMODULATED CHANNEL 2 TRAFFIC
TD22
CHANNEL 1 SHEET 1
TD21
Rx TRAFFIC (LOGIC)
MUTING CONTROL
8/W
8/1
8/2
8/3
SJ (SK)
0V
TD23
NARROW MUTE
WIDE MUTE
Rx TRAFFIC (TELEGRAPH)
Rx FSK INPUT
METER MONITORING
F2
CHANNEL
FUNCTION SELECT
FSK
Rx
1KHz
-15V
+15V
+5V
CHL 1 DC SUPPLIES
CHL 2 DC SUPPLIES
DC SUPPLIES
0V
MEDIUM
NARROW
WIDE
SJ (SK)
BANDWIDTH

CHANNEL 2 REFERENCES IN PARENTHESES ARE UNIQUE TO CHANNEL 1

TERMINAL TELEGRAPH (B)	M
FBD + BT SHEET 2 OF 2	

	INPUTS		MICRO SWITCH	FRONT PANEL					POWER SUPPLY UNIT					FAN		FRONT PANEL	ANTI-COND HEATERS		A AND Z SWITCHES		TRANSLATOR SIGNAL DATA			INPUT	FILTER	F1			BAND WIDTH SWITCH	ELEC SWITCH	F1		OUTPUTS FILTER		
									REPL												REPL				REPL					REPL			REPL		
			1	1					1C2					1E3		1	1				*				* * *				1	* *			* * *		
	115V 1Ø	DRAWER CLOSED	MICRO SWITCH	FUSE 1	115V 1Ø	FUSE 2	115V 1Ø	SWITCH M	115V 1Ø (EQPT)	POWER SUPPLIES	+15V	+5V	−15V	0V	COOLING FAN	COOLING AIR	115V 1Ø (HEATERS)	ANTI COND HEATERS	HEAT OUTPUT	FREQUENCY SELECTION	'A' ADDRESS	'Z' ADDRESS	FREQUENCY CONTROL	CLOCK	SELECTED 'A' LOCAL OSC	SELECTED 'Z' LOCAL OSC	Rx TRAFFIC (FSK BAL)	INPUT FILTERING	Rx TRAFFIC (FSK)	Rx TRAFFIC PROCESSING	BUFFERED Rx FSK OUTPUT (QA)	Rx TRAFFIC (LOGIC)	DEMODULATED CH2 TRAFFIC	MUTING CONTROL	NARROW OR WIDE MUTE	Rx TRAFFIC GATING CONTROL	MUTE	Rx TRAFFIC PROCESSING	Rx TRAFFIC (TELEGRAPH)	BUFFERED Rx FSK OUTPUT (QA)	OUTPUT FILTERING (1)	Rx TRAFFIC (TELEGRAPH)	OUTPUT FILTERING	Rx TRAFFIC (QA BAL)
TEST DATA No.	1	2		3		4		5	6	7	8	9	10	11	12			13	14	15	16	17	18	19	20	21	22	23	24	25	20	26	27		

1. BANDWIDTH SWITCH SET TO NARROW OR WIDE AS DESIRED

2. A AND Z SWITCHES AT A VALID OPERATIONAL SETTING

SET EQPT / HTRS SWITCH TO HTRS'

SET EQPT / HTRS SWITCH TO 'EQPT'

CHANNEL 1 OUTPUT ALSO DEPENDENT ON CHANNEL 2 IN DIVERSITY MODE

LOCATION CODES				
		*	* *	* * *
CH1	1	1B6	1B2	1E2
CH2	2	1A6	1A2	1E1

M	TERMINAL TELEGRAPH (B)
	MDC

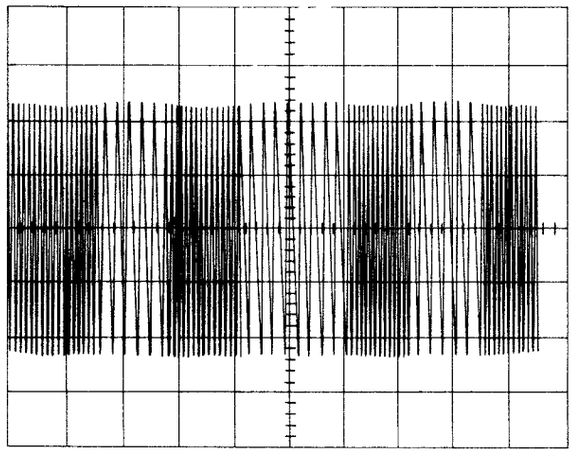
TD	SIGNAL TITLE	MAIN MEASURING POINTS				ALTERNATIVE MEASURING POINTS				TEST EQUIPMENT		PROCEDURES	INDICATIONS
		AVAIL ACCESS	AT	WITH RESPECT TO	LOC	AVAIL ACCESS	AT	WITH RESPECT TO	LOC	IDENTITY	SETTING		
1	115V 1Ø	A	SKB-B	SKB-C	1E					MULTIMETER (ITEM 1)	AC VOLTS, 300 VOLTS RANGE	DISCONNECT SKB	115V ±10%
			SKG1-20	CHASSIS	1E					MULTIMETER (ITEM 1)	OHMS, OHMS RANGE	PERFORM CHECK WITH SKB CONNECTED	< 1Ω
2	DRAWER CLOSED	IND	—	—								ENSURE THAT MICRO-SWITCH OPERATING MECHANISM IS OPERATED IF DRAWER IS OPEN.	DRAWER CLOSED
3	115V 1Ø	A	FUSE 1 (CENTRE)	FUSE 2 (CENTRE)	1D1					MULTIMETER (ITEM 1)	AC VOLTS, 300VOLTS RANGE		115V ±10%
4	115V 1Ø (EQPT)	A	FUSE 2 (CENTRE)	FUSE 1 (CENTRE)	1					MULTIMETER (ITEM 1)	AC VOLTS, 300 VOLTS RANGE		115V ±10%
5	115V 1Ø (EQPT)	IND	FRONT PANEL 'EQPT' LAMP	—	1								LAMP ILLUMINATED
6	+15V	MON	METER ON FRONT PANEL		1							SET CHANNEL SWITCH TO 1 OR 2 AS REQUIRED SET FUNCTION SWITCH TO + 15V	50% FSD ± 2 DIVISIONS
						A	TP 5 TP 2 TP2	TP 9 TP 13 TP 12	1A2 (1B2) 1A3 (1B3) 1A6 (1B6)	MULTIMETER (ITEM 1)	30V DC		+15V ± 0·75V
7	+5V	MON	METER ON FRONT PANEL		1							SET CHANNEL SWITCH TO 1 OR 2 AS REQUIRED. SET FUNCTION SWITCH TO + 5V	50% FSD ± 2 DIVISIONS
						A	TP 6 TP 1	TP 9 TP 12	1A2 (1B2) 1A6 (1B6)	MULTIMETER (ITEM 1)	10V DC		+5V ± 0·25V
8	−15V	MON	METER ON FRONT PANEL		1							SET CHANNEL SWITCH TO 1 OR 2 AS REQUIRED. SET FUNCTION SWITCH TO −15V	50% FSD ± 2 DIVISIONS
						A	TP 1 TP 4 TP 10	TP 9 TP13 TP 12	1A2 (1B2) 1A3 (1B3) 1A6 (1B6)	MULTIMETER (ITEM 1)	30V DC		− 15V ± 0·75V
9	0V	PCD	VALID IF TD6, 7 OR 8 VALID										
10	COOLING AIR	IND			1E3								FAN RUNNING
11	115V 1Ø (HTRS)	IND	FRONT PANEL 'HTRS' LAMP		1								LAMP ILLUMINATED
12	HEAT OUTPUT	IND	ANTI-COND' HEATERS		1								HEATERS PRODUCING HEAT
13	A ADDRESS	PCD	—	—								SIGNAL PRESENT IF TD16 IS VALID. ALSO VALIDATED IF EQUIPMENT OPERATES CORRECTLY IN Rx MODE	
14	Z ADDRESS	PCD	—	—								SIGNAL PRESENT IF TD17 IS VALID. ALSO VALIDATED IF EQUIPMENT OPERATES IN Rx MODE	
15	CLOCK	A	TP 4	TP12	1A6 (1B6)	A	TP6	TP11	1A2 (1B2)	COUNTER FREQUENCY (ITEM 2)	FUNCTION SWITCH SET TO 'FREQ Kc/s'		COUNTER READS 2 705280 MHz ± 0·1%

NOTE REFERENCES IN PARENTHESES ARE UNIQUE TO CHANNEL 1

TD	SIGNAL TITLE	MAIN MEASURING POINTS: AVAIL ACCESS	AT	WITH RESPECT TO	LOC	ALTERNATIVE MEASURING POINTS: AVAIL ACCESS	AT	WITH RESPECT TO	LOC	TEST EQUIPMENT: IDENTITY	SETTING	PROCEDURES	INDICATIONS
16	SELECTED A LOCAL OSC	A	TP8	TP12	1A6 (1B6)					COUNTER FREQUENCY (ITEM 2)	FUNCTION SWITCH TO 'FREQ Kc/s'	SET A SWITCH TO POS'N 1 —— '' —— 4: ROTATE Z SWITCH THROUGH POSITIONS 1–16 INCLUSIVE FOR EACH SETTING OF THE A SWITCH SET A SWITCH TO POS'N 5 —— '' —— 10: ROTATE Z SWITCH THROUGH POSITIONS 1–16 INCLUSIVE FOR EACH SETTING OF THE A SWITCH SET A SWITCH TO POS'N 11 —— '' —— 16: ROTATE Z SWITCH THROUGH POSITIONS 1–16 INCLUSIVE FOR EACH SETTING OF THE A SWITCH SET A SWITCH TO POS'N 17 —— '' —— 21: SET Z SWITCH TO POSITION 17 OR 18 / 17 OR 18 / 19 OR 20 / 20 OR 19 / 21	COUNTER READS 7225Hz 7395Hz 7565Hz 7735Hz COUNTER READS 7905Hz 8075Hz 8245Hz 8415Hz 8585Hz 8755Hz COUNTER READS 8925Hz 9095Hz 9265Hz 9435Hz 9605Hz 9775Hz COUNTER READS 7300Hz 7500Hz 8375Hz 9225Hz 9600Hz ±·1%
17	SELECTED Z LOCAL OSC	A	TP9	TP12	1A6 (1B6)					COUNTER FREQUENCY (ITEM 2)	FUNCTION SWITCH TO FREQ Kc/s'	SET Z SWITCH TO POS'N 1 —— '' —— 5: ROTATE A SWITCH THROUGH POSITIONS 1–16 INCLUSIVE FOR EACH SETTING OF THE Z SWITCH SET Z SWITCH TO POS'N 6 —— '' —— 10: ROTATE A SWITCH THROUGH POSITIONS 1–16 INCLUSIVE FOR EACH SETTING OF THE Z SWITCH SET Z SWITCH TO POS'N 11 —— '' —— 16: ROTATE A SWITCH THROUGH POSITIONS 1–16 INCLUSIVE FOR EACH SETTING OF THE Z SWITCH SET Z SWITCH TO POS'N 17 —— '' —— 21: SET A SWITCH TO POSITION 17 OR 18 / 17 OR 18 / 19 OR 20 / 20 OR 19 / 21	COUNTER READS 7225Hz 7395Hz 7565Hz 7735Hz 7905Hz COUNTER READS 8815Hz 8245Hz 8415Hz 8585Hz 8755Hz COUNTER READS 8925Hz 9095Hz 9625Hz 9435Hz 9605Hz 9775Hz COUNTER READS 7300Hz 7500Hz 8375Hz 9225Hz 7808Hz ±·1%
18	Rx TRAFFIC (FSK BAL)	A	SKA-E (SKC-E) / SKA-F (SKC-F)	SKA-Scr (SKC-Scr)	1E1					OSCILLOSCOPE (ITEM 3)		DISCONNECT SKA (SKC)	SEE WAVEFORMS A, B & C
19	Rx TRAFFIC (FSK)	MON	FRONT PANEL METER	—	1							SET CHANNEL SWITCH TO '1' OR '2' AS REQUIRED AND FUNCTION SWITCH TO 'Rx-FSK'	80% ±3 DIV FOR 0dBm INPUT LEVEL
20	BUFFERED Rx FSK OUTPUT (QA)	A	SKH1-16 (SKH1-37)	SKH1-7 (SKH1-36)	1D1	A	SKE-W (SKE-U) / SKE-H (SKE-D)	SKE-G (SKE-C)	1E1 (1E2)	OSCILLOSCOPE (ITEM 3)			SEE WAVEFORMS A, B & C
21	Rx TRAFFIC (LOGIC)	A	TP1	TP13	1A3 (1B3)					LOGIC PROBE (ITEM 15)	COUNT		H21
22	DEMODULATED CHANNEL 2 TRAFFIC	A	TP6	TP13	1A3 (1B3)					OSCILLOSCOPE (ITEM 3)		SET MODE SWITCH TO DIVERSITY SIGNAL VALID ON CHANNEL 2 ONLY	±1V WITH CH2 Rx-FSK TRAFFIC PRESENT
23	NARROW MUTE / WIDE MUTE	A	SJ8-1 (SK8-1) / SJ8-3 (SK8-3)	TP8	1A2 (1B2)					MULTIMETER (ITEM 1)	DC VOLTS, 10 VOLTS RANGE	SET BANDWIDTH SWITCH TO NARROW / SET BANDWIDTH SWITCH TO WIDE	−5V ±0·25V
24	MUTE	IND	LED D1	—	1A2 (1B2)							ENSURE THAT THERE IS NOT EXCESSIVE NOISE ON Rx-FSK AT TD18	LED EXTINGUISHED
25	Rx TRAFFIC (TELEGRAPH)	MON	FRONT PANEL METER	—	1							SET CHANNEL SWITCH TO '1' OR '2' AS REQUIRED AND FUNCTION SWITCH TO 'Rx' 1kHz	80% ±3DIV FOR SPACE 20% ±3DIV FOR MARK
						A	SKH1-8 (SKH1-34)	SKH1-9 (SKH1-35)	1D1	OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM D
26	Rx TRAFFIC (TELEGRAPH BAL)	A	SKD-B (SKF-B) / SKD-C (SKF-C)	SKD-A / SKF-A	1E1					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM D
27	Rx TRAFFIC (QA BAL)	PCD	QUALITY ASSESSOR	—								IF QUALITY ASSESSOR INDICATES THAT THE Rx-FSK INPUT IS SATISFACTORY, THIS SIGNAL IS VALIDATED	

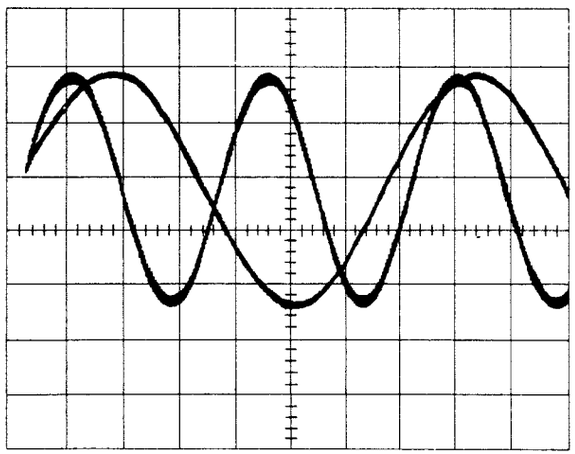
NOTE MEASURING POINTS AND A N REFERENCES IN PARENTHESIS ARE UNIQUE TO CHANNEL 1

WAVEFORM 'A'
AMPLITUDE 0.5V/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER



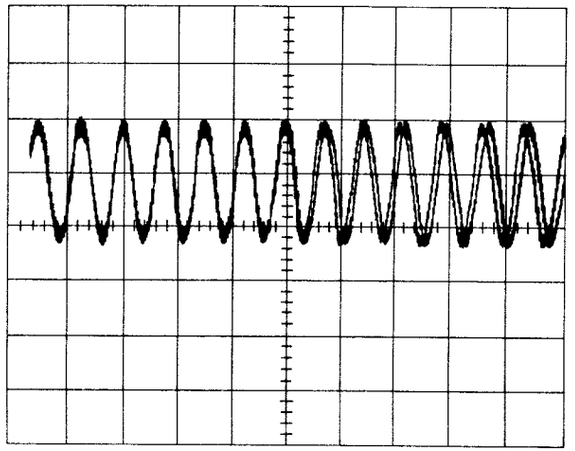
THIS WAVEFORM ILLUSTRATES A TYPICAL FSK SIGNAL AT 0dBM. IN THIS CASE THE TWO FREQUENCIES ARE CLEARLY DISTINGUISHABLE IN THE EVENT THAT THIS IS NOT THE CASE THEN WAVEFORMS 'B' AND 'C' SHOULD BE REFERRED TO
NB WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

WAVEFORM 'B'
AMPLITUDE 0.5V/DIV
TIMEBASE 200μS/DIV
INTERNAL TRIGGER



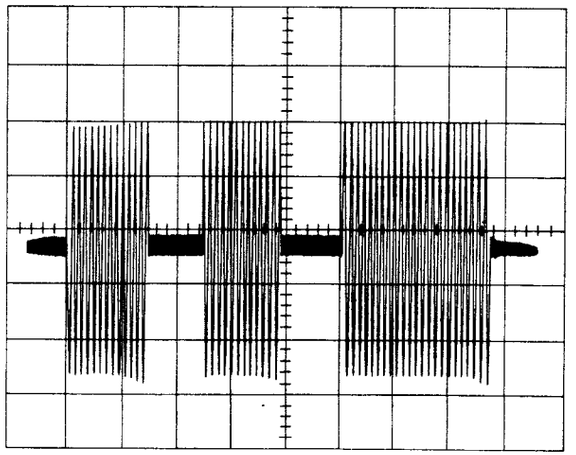
THIS WAVEFORM ILLUSTRATES THE TWO COMPONENT FREQUENCIES OF A TYPICAL FSK SIGNAL WITH A RELATIVELY WIDE FREQUENCY SHIFT THE TWO FREQUENCIES MAY BE CALCULATED BY OBSERVING THIS WAVEFORM
NB WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

WAVEFORM 'C'
AMPLITUDE 1.0V/DIV
TIMEBASE 200μS/DIV
INTERNAL TRIGGER



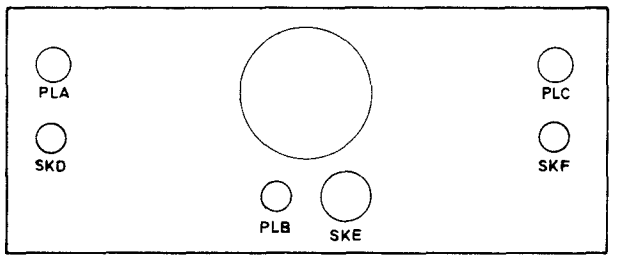
THIS WAVEFORM ILLUSTRATES THE TWO COMPONENT FREQUENCIES OF AN FSK SIGNAL WITH A NARROW FREQUENCY SHIFT
NB WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

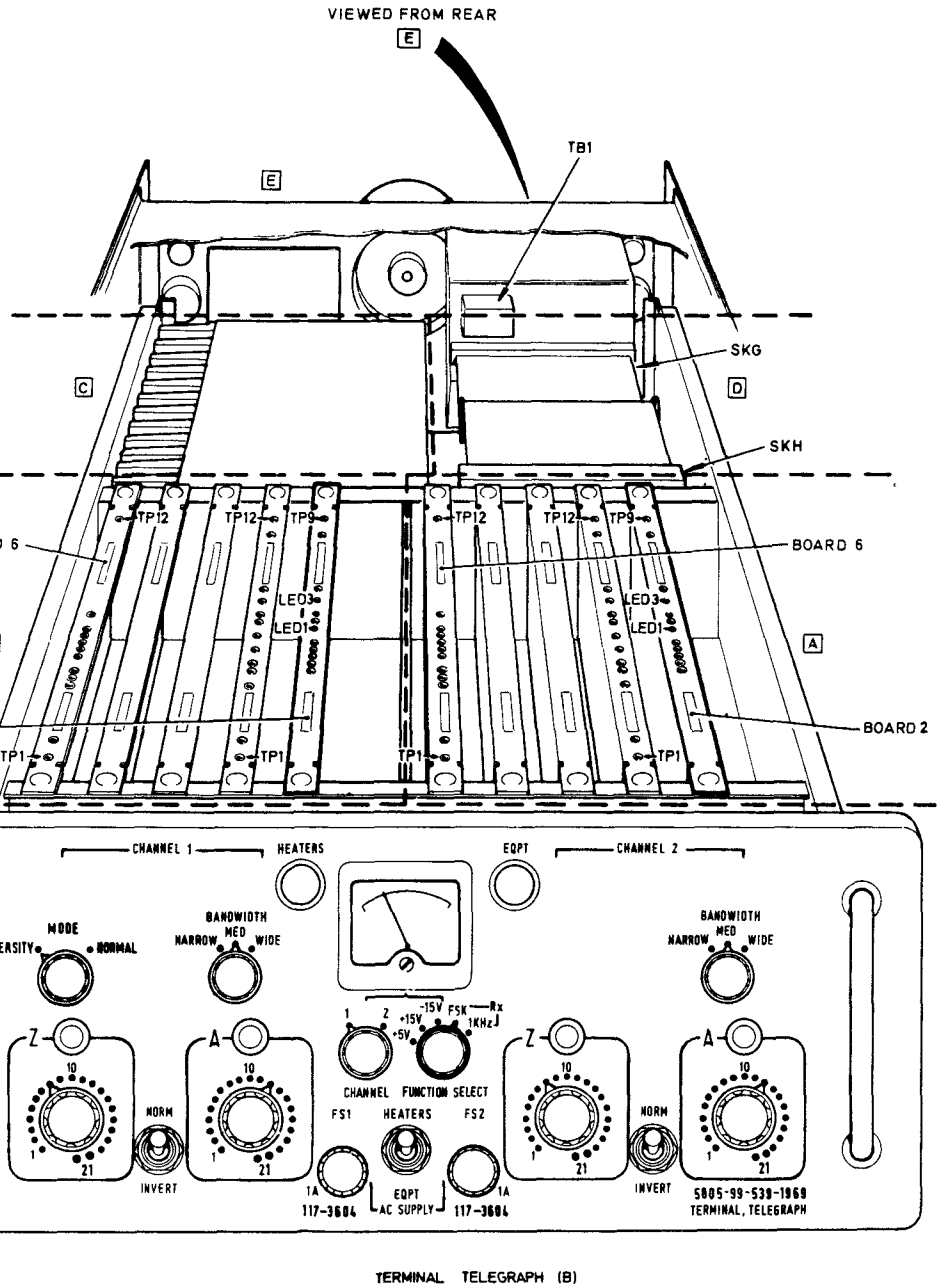
WAVEFORM 'D'
AMPLITUDE 0.5V/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER



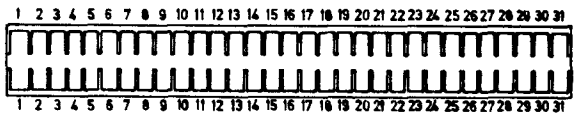
THIS WAVEFORM ILLUSTRATES A 1KHz ON/OFF SIGNAL. THE MARK/SPACE RELATIONSHIP SHOULD BE CLEARLY OBSERVABLE
NB WHEN OBSERVING WAVEFORM AT SKD (SKF) AMPLITUDE WILL BE HALVED

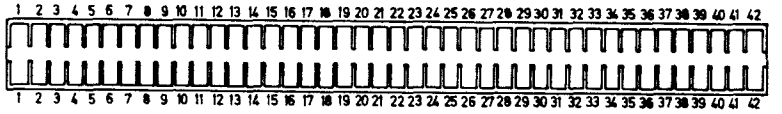
METER MONITORING (B)	F2
TDC SHEET 2 OF 2	





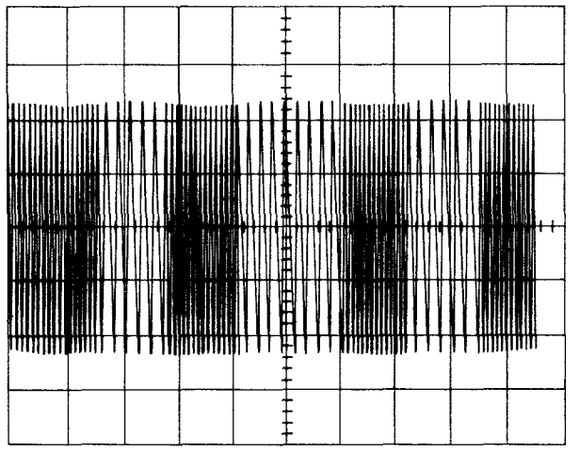
TERMINAL TELEGRAPH (B)





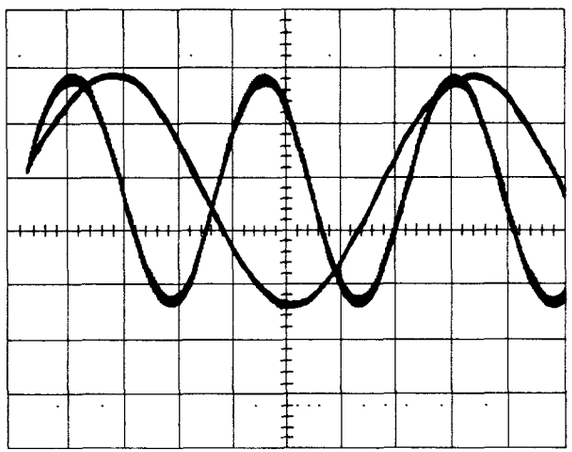
F2	METER MONITORING (B)
	LOD

WAVEFORM 'A'
AMPLITUDE 0.5V/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER



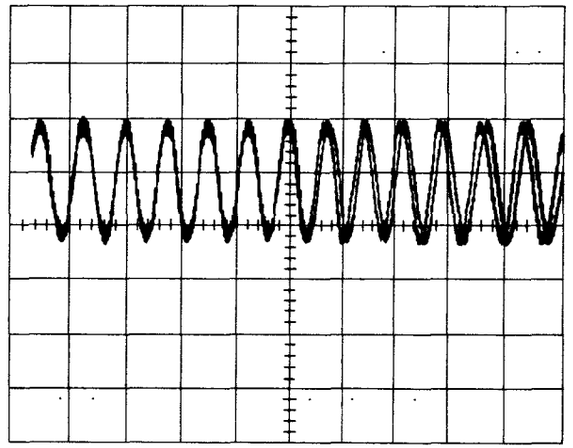
THIS WAVEFORM ILLUSTRATES A TYPICAL FSK SIGNAL AT 0dBM. IN THIS CASE THE TWO FREQUENCIES ARE CLEARLY DISTINGUISHABLE. IN THE EVENT THAT THIS IS NOT THE CASE THEN WAVEFORMS 'B' AND 'C' SHOULD BE REFERRED TO
N.B WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

WAVEFORM 'B'
AMPLITUDE 0.5V/DIV
TIMEBASE 200μS/DIV
INTERNAL TRIGGER



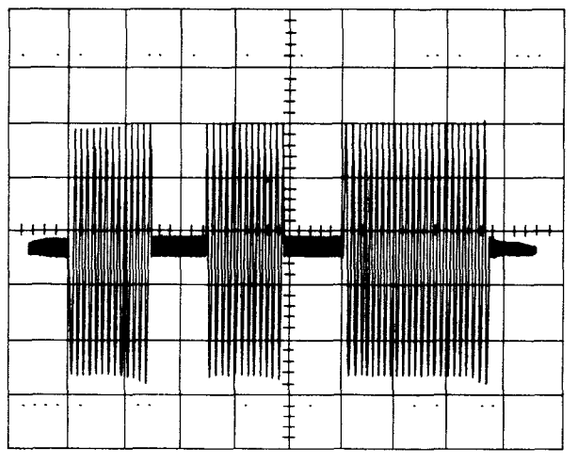
THIS WAVEFORM ILLUSTRATES THE TWO COMPONENT FREQUENCIES OF A TYPICAL FSK SIGNAL WITH A RELATIVELY WIDE FREQUENCY SHIFT. THE TWO FREQUENCIES MAY BE CALCULATED BY OBSERVING THIS WAVEFORM
N.B. WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

WAVEFORM 'C'
AMPLITUDE 1.0V/DIV
TIMEBASE 200μS/DIV
INTERNAL TRIGGER



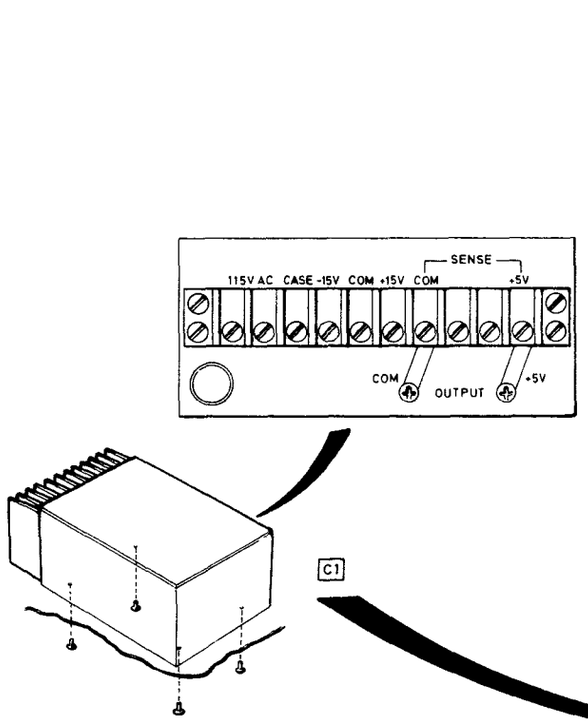
THIS WAVEFORM ILLUSTRATES THE TWO COMPONENT FREQUENCIES OF AN FSK SIGNAL WITH A NARROW FREQUENCY SHIFT
NB WHEN OBSERVING WAVEFORM AT PLA (PLC) OR SKE AMPLITUDE WILL BE HALVED

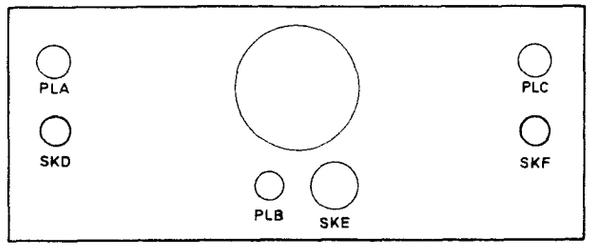
WAVEFORM 'D'
AMPLITUDE 0.5V/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER

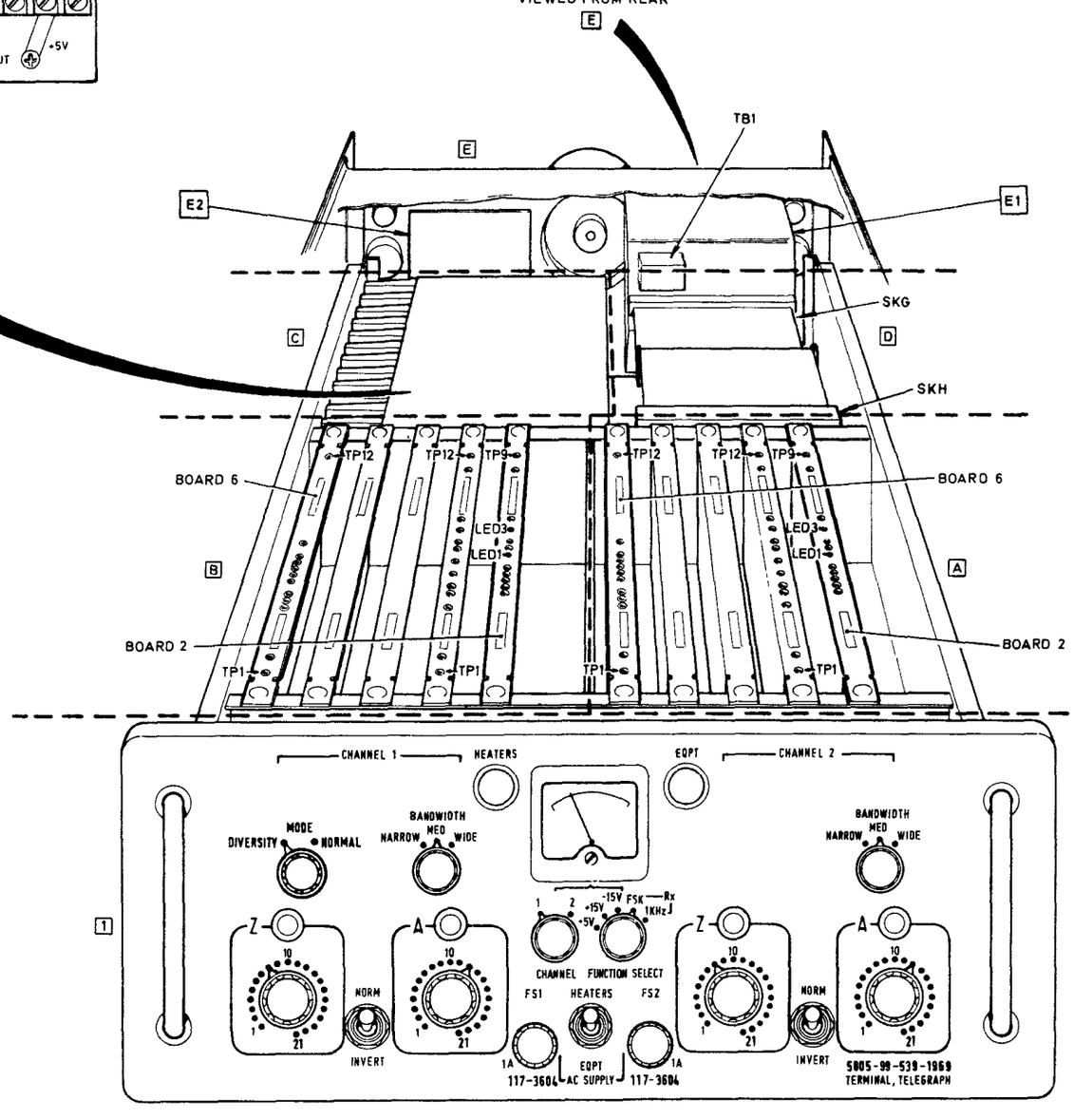


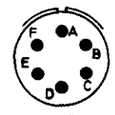
THIS WAVEFORM ILLUSTRATES A 1KHz ON/OFF SIGNAL. THE MARK/SPACE RELATIONSHIP SHOULD BE CLEARLY OBSERVABLE
N.B. WHEN OBSERVING WAVEFORM AT SKD (SKF) AMPLITUDE WILL BE HALVED

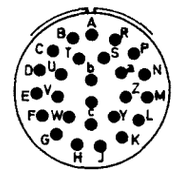
TERMINAL TELEGRAPH (B)	M
TDC SHEET 3 OF 3	

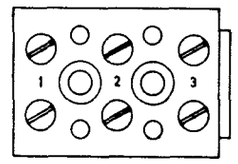


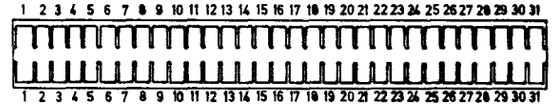


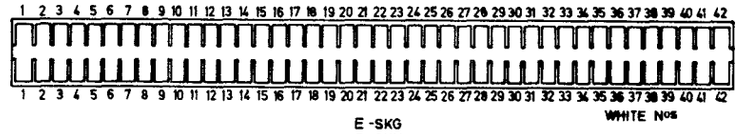








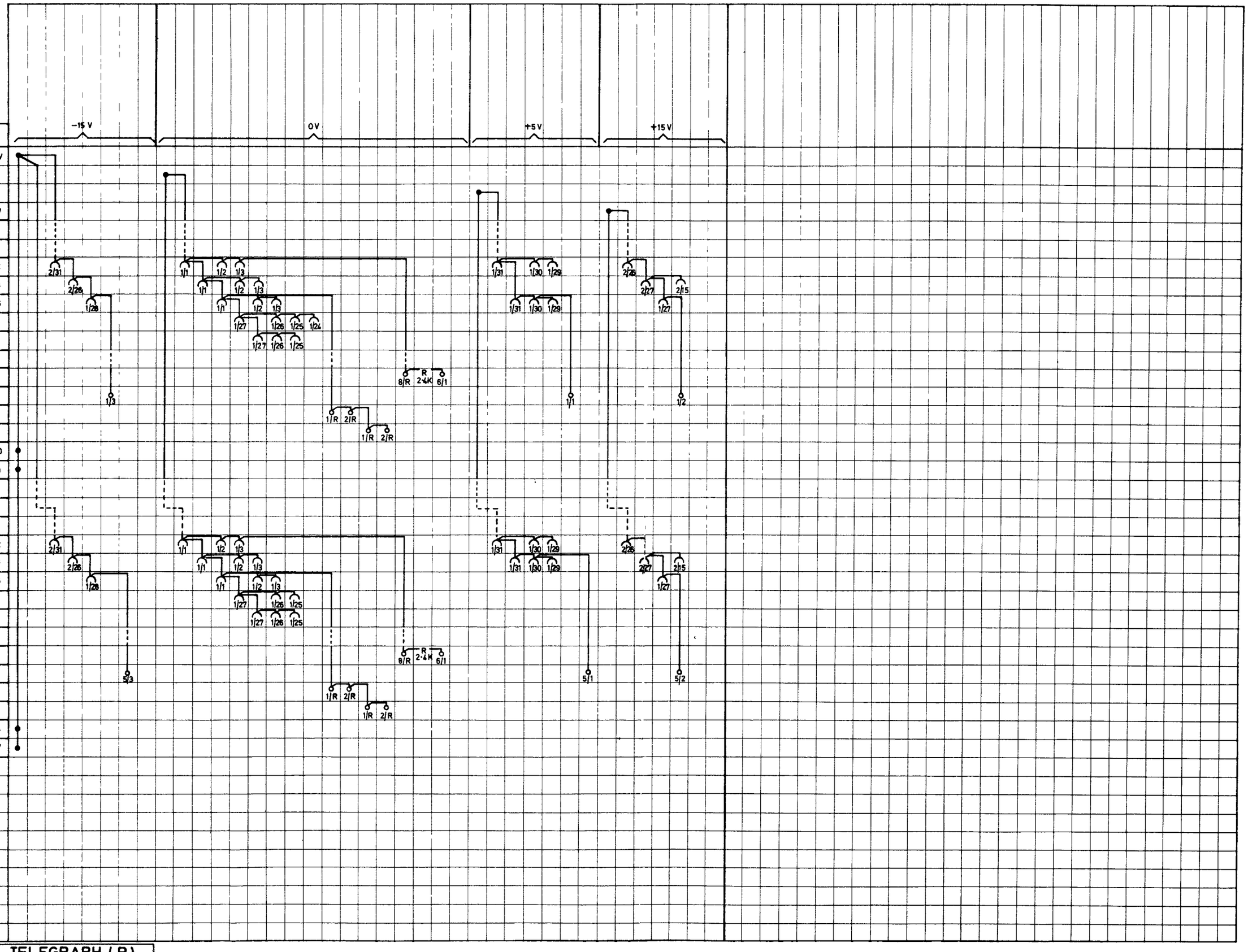




TERMINAL TELEGRAPH (B)	M
LOD	

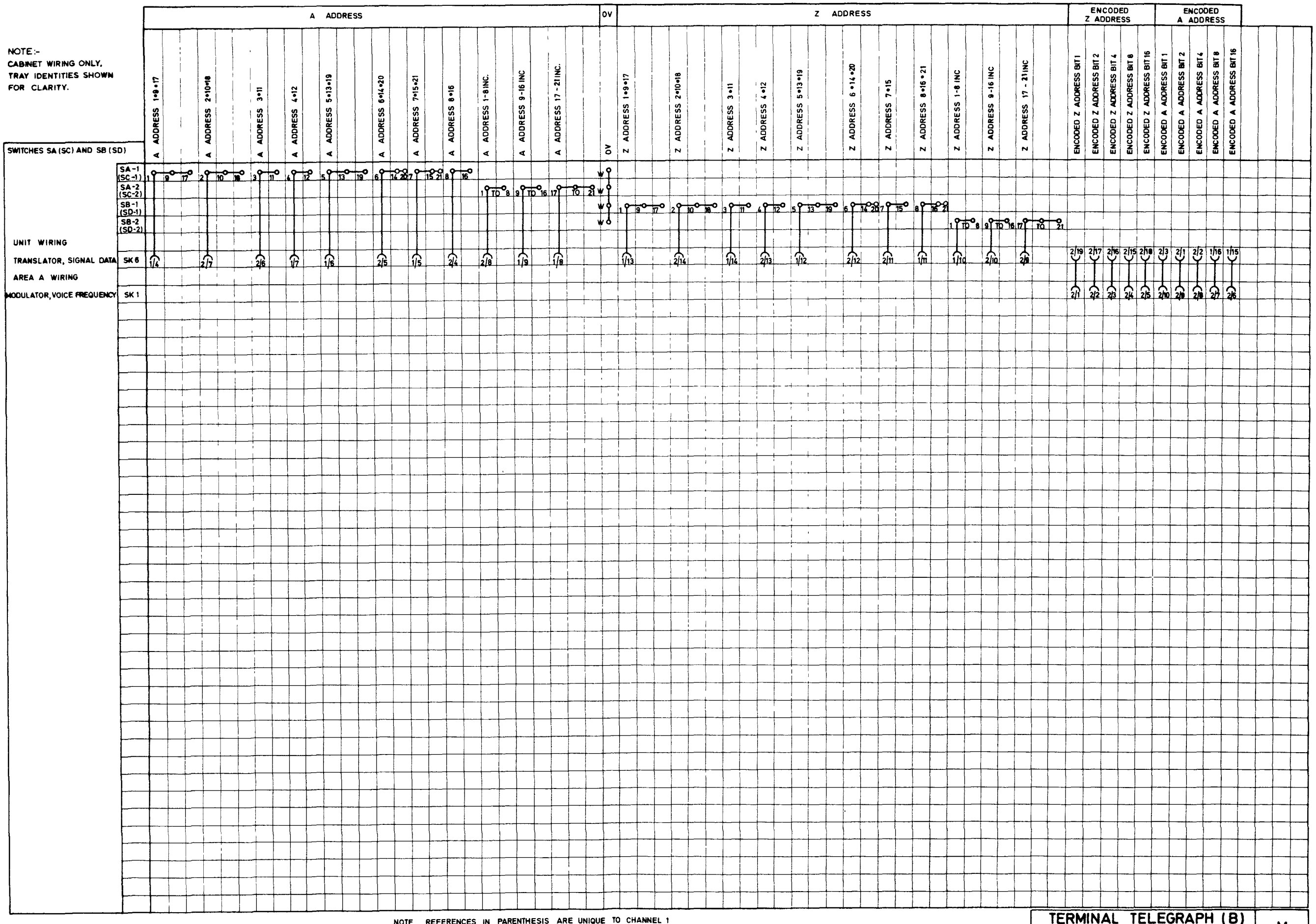
TERMINAL TELEGRAPH (B)

POWER SUPPLY UNIT C-1	-15V	
	0V	
	+5V	
	+15V	
AREA C-1 TO AREA A DISTRIBUTION		
CHANNEL 2		
	ELECTRONIC SWITCH (PCB 2)	SK 2
	DEMODULATOR ASSESSOR (PCB3)	SK 3
	TRANSLATOR SIGNAL DATA(PCB6)	SK 6
	FILTER BANDPASS (PCB 5)	SK 5
A	FILTER BANDPASS (PCB 4)	SK 4
	AREA A TO AREA 1 DISTRIBUTION	
	BAND WIDTH SWITCH	SJ
	FUNCTION SELECT SWITCH	SF
	'A' SELECT SWITCH	SA
	'Z' SELECT SWITCH	SB
	'A' LAMP (OUTER)	LP10
	'Z' LAMP (OUTER)	LP 9
AREA C-1 TO AREA B DISTRIBUTION		
CHANNEL 1		
	ELECTRONIC SWITCH (PCB 2)	SK 2
	DEMODULATOR ASSESSOR (PCB3)	SK 3
	TRANSLATOR SIGNAL DATA(PCB6)	SK 6
	FILTER BANDPASS (PCB 5)	SK 5
B	FILTER BANDPASS (PCB 4)	SK 4
	AREA B TO AREA A DISTRIBUTION	
	BAND WIDTH SWITCH	SK
	FUNCTION SELECT SWITCH	SF
	'A' SELECT SWITCH	SC
	'Z' SELECT SWITCH	SD
	'A' LAMP (OUTER)	LP8
	'Z' LAMP (OUTER)	LP7



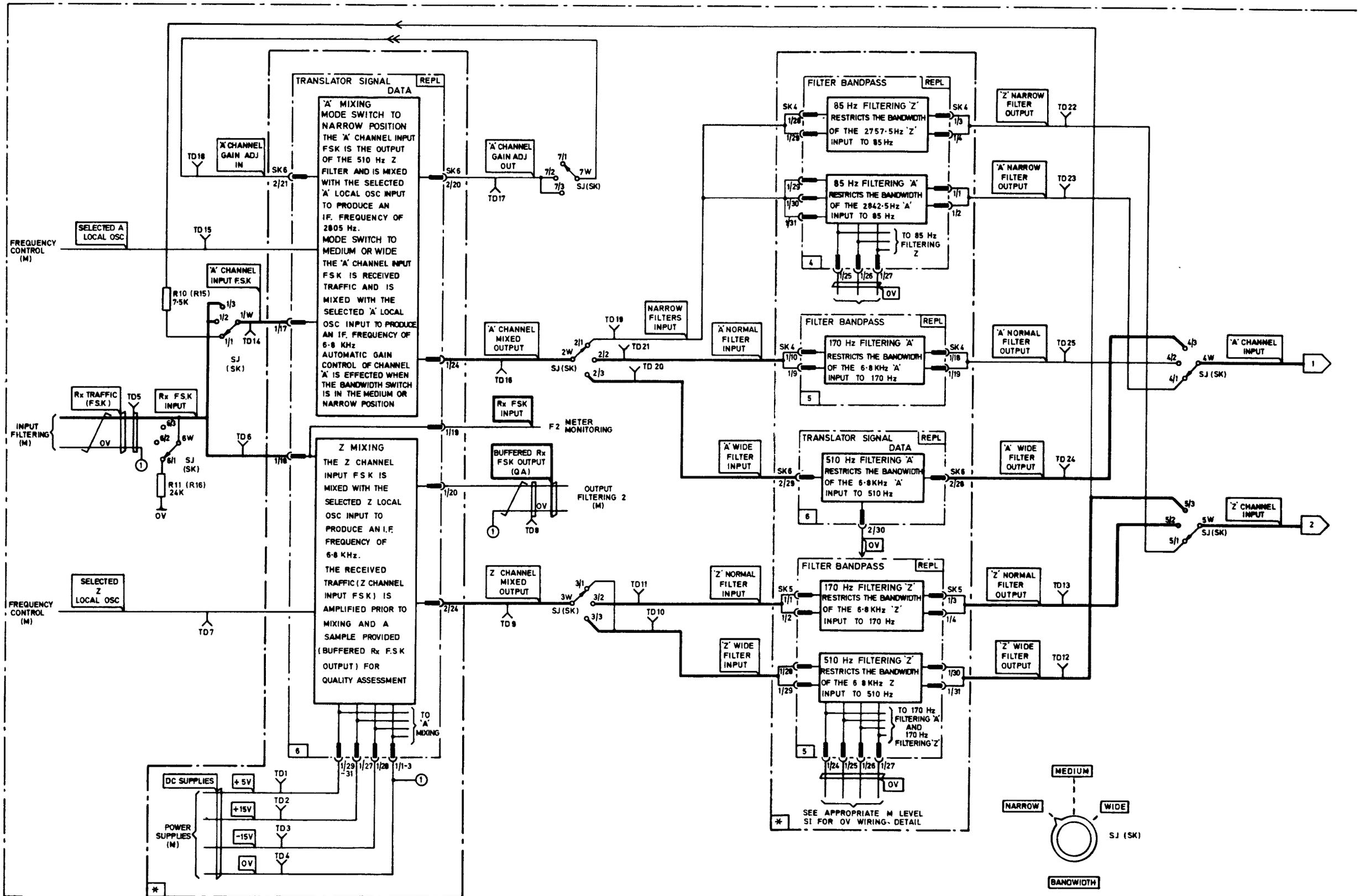
M	TERMINAL TELEGRAPH (B)
SI	SHEET 1 OF 2

NOTE:-
CABINET WIRING ONLY.
TRAY IDENTITIES SHOWN
FOR CLARITY.



NOTE REFERENCES IN PARENTHESIS ARE UNIQUE TO CHANNEL 1

TERMINAL TELEGRAPH (B)	M
SI SHEET 2 OF 2	



F1	RX TRAFFIC PROCESSING (B)
	FBD + BT SHEET 1 OF 2

MODE CONTROL
W
1
2
SP
SEE NOTE 3
0V
DIVERSITY CONTROL
TD28
SK3
DEMODULATED CHANNEL 2 TRAFFIC
F1 (CH2)
SEE NOTE 3
TD31
1/30

ASSESSOR

1. NORMAL MODE DEMODULATED SIGNALS ARE ASSESSED AND CONVERTED TO TTL LOGIC LEVELS IN EACH CHANNEL SEPARATELY.
2. DIVERSITY MODE CHANNEL 1 AND CHANNEL 2 DEMODULATED TRAFFIC ARE SUMMED IN CHANNEL 1 ASSESSOR AND THE RESULTANT SIGNAL CONVERTED TO TTL LOGIC LEVELS.

1
TD27
2/1
1/1
0V

DEMODULATOR

DEMODULATES A & Z CHANNEL INPUTS TO DRIVE A & Z LAMPS.
DEMODULATED CHANNEL 2 TRAFFIC IS ROUTED TO CHANNEL 1 ASSESSOR FOR USE IN DIVERSITY MODE

2
TD26
2/25
1/27
0V

SK3
2/31
Rx TRAFFIC (LOGIC)
TD32
SK2
2/5
Rx TRAFFIC (LOGIC)
MODE CONTROL (M)

ELECTRONIC SWITCH
REPL

BUFFER Rx TRAFFIC LOGIC

PROVIDES NORMAL AND INVERTED VERSIONS OF THE INPUT

SK 2
2/7
2/6
GATED Rx TRAFFIC (LOGIC)
TD33
GATED Rx TRAFFIC LOGIC
TD34
nc
no
NORMAL
INVERT

Rx TRAFFIC (CONVERTED)
TD35
co
SL(SN)
2/21

Tx AND Rx FREQUENCY CONTROL (M)
CLOCK
TD36
SK2
2/30
CONTROL (M)
MUTE
TD37

GATE Rx TRAFFIC

PROVIDED THAT THE LOGIC LEVEL — 'MUTE' IS CORRECT THE Rx TRAFFIC (CONVERTED) SIGNAL WILL GATE OUT THE 1KHz TONE AS Rx TRAFFIC (TELEGRAPH)

SK2
2/25
2/26
TD38
Rx TRAFFIC (TELEGRAPH)
F2 METER MONITORING
OUTPUT FILTERING (1) (M)

A LAMP
LP10 (8)
TD29
2/3
Z LAMP
LP9 (7)
TD30
2/6
DEMODULATED CHANNEL 2 TRAFFIC
SEE NOTE 3
F1 (CH1)
TD31
2/24
-15V

3
SK3
2/27
2/26
1/1
1/2
1/3

DC SUPPLIES
+15V
-15V
0V
POWER SUPPLIES (M)

DIVERSITY
NORMAL
MODE

2
SK2
1/29
1/30
1/31
1/1
1/2
1/3

DC SUPPLIES
+5V
0V
POWER SUPPLIES (M)

2/16
2/31
+15V
-15V

DC SUPPLIES
POWER SUPPLIES (M)

NOTE (APPLICABLE TO TERMINAL TELEGRAPH (B) ONLY)
1 THE CIRCUIT REFERENCES SHOWN IN BRACKETS ARE APPLICABLE TO CHANNEL 1
2 AREAS MARKED THUS ✱ DENOTE AREA B CHANNEL 1 OR AREA A CHANNEL 2.
3 SEE SI FOR DIFFERENCES BETWEEN CHANNEL 1 AND CHANNEL 2 CONNECTIONS.

Rx TRAFFIC PROCESSING (B)	F1
FBD + BT SHEET 2 OF 2	

	INPUTS				INPUT	B W SWITCH	INPUT	TRANSLATOR SIGNAL DATA		B W SWITCH		FILTER B'PASS	FILTER B'PASS	B W. SWITCH & RESISTOR		INPUT	TRANSLATOR SIGNAL DATA		B W SWITCH		FILTER B'PASS	FILTER B'PASS	TRANSLATOR SIGNAL DATA	FILTER B'PASS	B W SWITCH	B W SWITCH	MODE SWITCH	DEMODULATOR ASSESSOR				ELECTRONIC SWITCH		NORMAL INVERT SW			OUTPUTS ELEC SWITCH		
								REPL				REPL	REPL				REPL					REPL	REPL	REPL	REPL				REPL				REPL					REPL	
						1		1A6 (1B6)		1		1A5(1B5)	1A5(1B5)	1			1A6 (1B6)		1		1		1A4(1B4)	1A4 (1B4)	1A6 (1B6)	1A5 (1B5)	1	1	1	1A3 (1B3)				1A2 (1B2)		1			1A2 (1B2)		
	+5V	+15V	-15V	0V	Rx TRAFFIC (FSK)	SJ (K) 6	Rx F.S.K. INPUT	SELECTED 'Z' LOCAL OSC	'Z' MIXING	BUFFERED Rx FSK OUTPUT (QA)	'Z' CHANNEL MIXED OUTPUT	SJ (K) 3	'Z' WIDE FILTER INPUT	'Z' NORMAL FILTER INPUT	510 Hz FILTERING Z	'Z' WIDE FILTER OUTPUT	170 Hz FILTERING Z	'Z' NORMAL FILTER OUTPUT	RESISTOR 7·5K	SJ (K) 1	'A' CHANNEL INPUT FSK	SELECTED 'A' LOCAL OSC	'A' MIXING	'A' CHANNEL MIXED OUTPUT	'A' CHANNEL GAIN ADJ OUT	SJ (K) 7	'A' CHANNEL GAIN ADJ IN	SJ (K) 2	NARROW FILTER INPUTS	'A' WIDE FILTER INPUT	'A' NORMAL FILTER INPUT	85 Hz FILTERING 'Z'	'Z' NARROW FILTER OUTPUT	85 Hz FILTERING 'A'	'A' NARROW FILTER OUTPUT	510 Hz FILTERING 'A'	'A' WIDE FILTER OUTPUT	170 Hz FILTERING 'A'	'A' NORMAL FILTER OUTPUT	SJ (K) 5	'Z' CHANNEL INPUT	SJ (K) 4	'A' CHANNEL INPUT	SP	DIVERSITY CONTROL	DEMODULATING	A LAMP	Z LAMP	CHANNEL 2 TRAFFIC	LOGIC CONVERSION	Rx TRAFFIC (LOGIC)	BUFFER Rx TRAFFIC LOGIC	GATED Rx TRAFFIC (LOGIC)	GATED Rx TRAFFIC (LOGIC)	SL (SN)	Rx TRAFFIC (CONVERTED)	CLOCK	MUTE	GATE Rx TRAFFIC	Rx TRAFFIC (TELEGRAPH)	BUFFERED Rx FSK OUTPUT (QA)	Rx TRAFFIC (LOGIC)
TEST DATA No.	1	2	3	4	5	6		7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	8	32
	MON	MON	MON	PCD	MON			A								A																						ING				

SET BANDWIDTH SWITCH TO MEDIUM
SET MODE SWITCH TO NORMAL

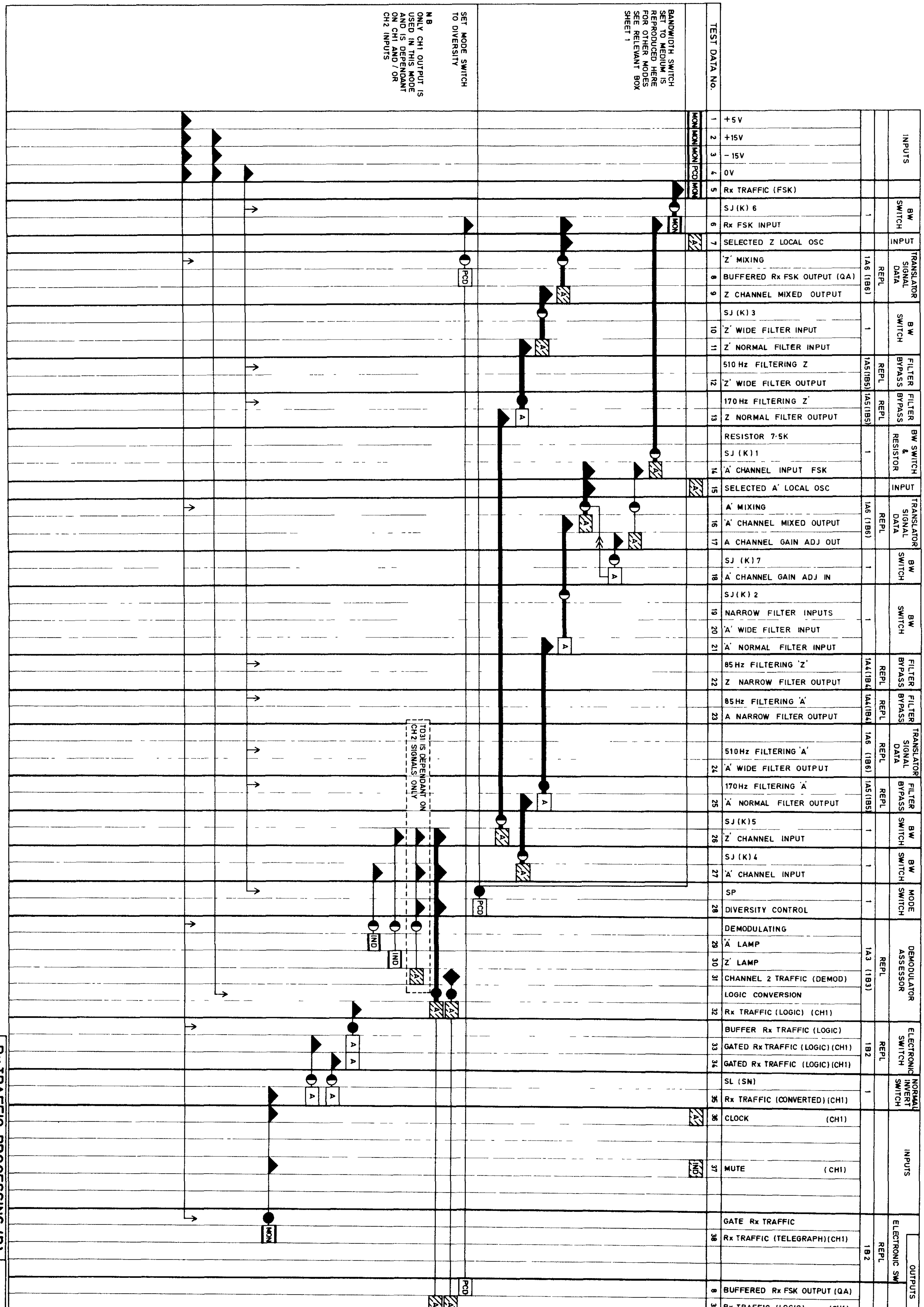
SET BANDWIDTH SWITCH TO WIDE
SET MODE SWITCH TO NORMAL

SET BANDWIDTH SWITCH TO NARROW
SET MODE SWITCH TO NORMAL

LOCATION CODES					
	*1	*2	*3	*4	*5
CHANNEL 1	1B2	1B3	1B4	1B5	1B6
CHANNEL 2	1A2	1A3	1A4	1A5	1A6

NOTE THE CIRCUIT REFERENCES IN PARENTHESIS ARE APPLICABLE TO CHANNEL 1

F1	RX TRAFFIC PROCESSING (B)
	MDC SHEET 1 OF 2



Rx TRAFFIC PROCESSING (B)
MDC
SHEET 2 OF 2
F1

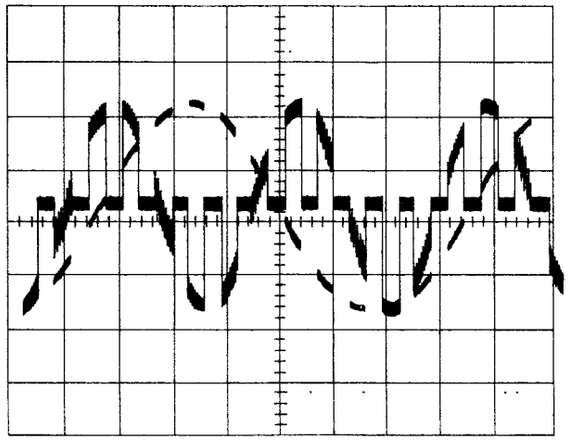
TD	SIGNAL TITLE	MAIN MEASURING POINTS				ALTERNATIVE MEASURING POINTS				TEST EQUIPMENT		PROCEDURES	INDICATIONS
		AVAIL ACCESS	AT	WITH RESPECT TO	LOC	AVAIL ACCESS	AT	WITH RESPECT TO	LOC	IDENTITY	SETTING		
1	+5V	MON	VERIFIED AT MASTER LEVEL										
2	+15V	MON	VERIFIED AT MASTER LEVEL										
3	-15V	MON	VERIFIED AT MASTER LEVEL										
4	0V	PCD	VERIFIED AT MASTER LEVEL										
5	Rx TRAFFIC (FSK)	MON	VERIFIED AT MASTER LEVEL										
6	Rx F S K INPUT	MON	FRONT PANEL METER		1							SET CHANNEL SWITCH TO 1 OR 2 AS REQUIRED SET FUNCTION SWITCH TO Rx F S K	METER READING FLUCTUATES (WITH Rx TRAFFIC LEVEL) BETWEEN 20 - 80 % FSD
						PCD						SIGNAL PRESENT IF TD8 IS VALID.	
7	SELECTED 'Z' LOCAL OSC	A	VERIFIED AT MASTER LEVEL										
8	BUFFERED Rx F S K OUTPUT (QA)	PCD											VERIFIED AT M LEVEL
9	'Z' CHANNEL MIXED OUTPUT	A	TP5	TP12	* 5					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'A'
10	WIDE 'Z' FILTER INPUT	A	SJ 3/3 (SK 3/3)	TP12	* 5					OSCILLOSCOPE (ITEM 3)			AS TD 9
11	NORMAL 'Z' FILTER INPUT	A	SJ 3/2 (SK 3/2)	TP12	* 5					OSCILLOSCOPE (ITEM 3)			AS TD 9
12	'Z' WIDE FILTER OUTPUT	A	SJ 5/3 (SK 5/3)	TP12	* 5					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'B'
13	'Z' NORMAL FILTER OUTPUT	A	SJ 5/2 (SK 5/2)	TP12	* 5					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'C'
14	'A' CHANNEL INPUT F S K	A	TP11	TP12	* 5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO MEDIUM OR WIDE	SEE WAVEFORM 'A' AT M LEVEL
		A	TP11	TP12	* 5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO NARROW	NOMINALLY 6 8 KHz TONE AMPLITUDE 0 2Vpk-pk
15	SELECTED 'A' LOCAL OSC	A	VERIFIED AT MASTER LEVEL										
16	'A' CHANNEL MIXED OUTPUT	A	TP6	TP12	* 5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO WIDE OR MEDIUM	SEE WAVEFORM 'A'
		A	TP6	TP12	* 5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO NARROW	SEE WAVEFORM 'E' TOP TRACE
17	'A' CHANNEL GAIN ADJUST OUT	A	TP7	TP12	* 5					OSCILLOSCOPE (ITEM 3)			AMPLIFIED VERSION OF TD14 WAVEFORM 'E' BOTTOM TRACE
18	'A' CHANNEL GAIN ADJUST IN	A	SJ -7W (SK -7W)	TP12	* 5					OSCILLOSCOPE (ITEM 3)			AS TD 17
19	NARROW FILTERS INPUT	A	SJ 2/1 (SK 2/1)	TP12	* 5					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'E' TOP TRACE
20	WIDE 'A' FILTER INPUT	A	SJ 2/3 (SK 2/3)	TP12	* 5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO WIDE	AS TD16
21	NORMAL 'A' FILTER INPUT	A	SJ 2/2 (SK 2/2)	TP12	* 5					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO MEDIUM	AS TD16
22	'Z' NARROW FILTER OUTPUT	A	SJ 5/1 (SK 5/1)	TP13	* 2					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'D'
23	'A' NARROW FILTER OUTPUT	A	SJ 4/1 (SK 4/1)	TP13	* 2					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'D'
24	'A' WIDE FILTER OUTPUT	A	SJ 4/3 (SK 4/3)	TP13	* 2					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'B'
25	'A' NORMAL FILTER OUTPUT	A	SJ 4/2 (SK 4/2)	TP13	* 2					OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM 'C'

F1	Rx TRAFFIC PROCESSING (B)
	TDC SHEET 1 OF 3

	LOCATION CODES				
	* 1	* 2	* 3	* 4	* 5
CHANNEL 1	1B2	1B3	1B4	1B5	1B6
CHANNEL 2	1A2	1A3	1A4	1A5	1A6

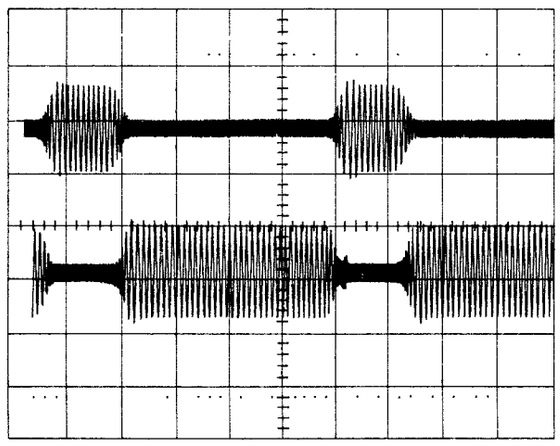
TD	SIGNAL TITLE	MAIN MEASURING POINTS				ALTERNATIVE MEASURING POINTS				TEST EQUIPMENT		PROCEDURES	INDICATIONS
		AVAIL ACCESS	AT	WITH RESPECT TO	LOC	AVAIL ACCESS	AT	WITH RESPECT TO	LOC	IDENTITY	SETTING		
26	'Z' CHANNEL INPUT	A	TP9	TP13	* 2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO MEDIUM	AS TD13
		A	TP9	TP13	* 2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO WIDE	AS TD12
		A	TP9	TP13	* 2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO NARROW	AS TD22
27	'A' CHANNEL INPUT	A	TP12	TP13	* 2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO MEDIUM	AS TD25
		A	TP12	TP13	* 2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO WIDE	AS TD24
		A	TP12	TP13	* 2					OSCILLOSCOPE (ITEM 3)		SET BANDWIDTH SWITCH TO NARROW	AS TD22
28	DIVERSITY CONTROL	PCD										SIGNAL PRESENT IF TD31 AND TD32 ARE VALID	
29	'A' LAMP	IND	FRONT PANEL										'A' LAMP ILLUMINATES WITH A CHANNEL TRAFFIC
30	'Z' LAMP	IND	FRONT PANEL										'Z' LAMP ILLUMINATES WITH Z CHANNEL TRAFFIC
31	DEMODULATED CHANNEL 2 TRAFFIC	A	TP6	TP13	1A3					OSCILLOSCOPE (ITEM 3)		NOTE : ONLY APPLICABLE TO CHANNEL 2 DEMODULATOR/ASSESSOR WHEN MODE SWITCH IS SET TO DIVERSITY	SIGNAL WILL ALTERNATE BETWEEN ± 1VOLT WITH CH2 Rx-FSK TRAFFIC PRESENT
32	Rx TRAFFIC (LOGIC)	A	TP1	TP13	* 2					LOGIC PROBE (ITEM 15)	COUNT		H21
33	GATED Rx TRAFFIC (LOGIC)	A	SL N/C (SN N/C)							LOGIC PROBE (ITEM 15)	COUNT		H21
34	GATED Rx TRAFFIC (LOGIC)	A	SL N/O (SN N/O)							LOGIC PROBE (ITEM 15)	COUNT		H21
35	Rx TRAFFIC (CONVERTED)	A	SL C/O (SN C/O)							LOGIC PROBE (ITEM 15)	COUNT	NORMAL/INVERT SWITCH IN EITHER POSITION	H21
36	CLOCK	A	VERIFIED AT MASTER LEVEL										
37	MUTE	GND	VERIFIED AT MASTER LEVEL										
38	Rx TRAFFIC TELEGRAPH	MON	FRONT PANEL METER									SET CHANNEL SWITCH TO '1' OR '2' AS REQUIRED AND FUNCTION SWITCH TO Rx-1KHz	METER READING FLUCTUATES (WITH Rx TRAFFIC) BETWEEN 20% AND 80% FSD

WAVEFORM 'A'
AMPLITUDE 2.0V/DIV
TIMEBASE TYPICALLY 200µS/DIV
INTERNAL TRIGGER



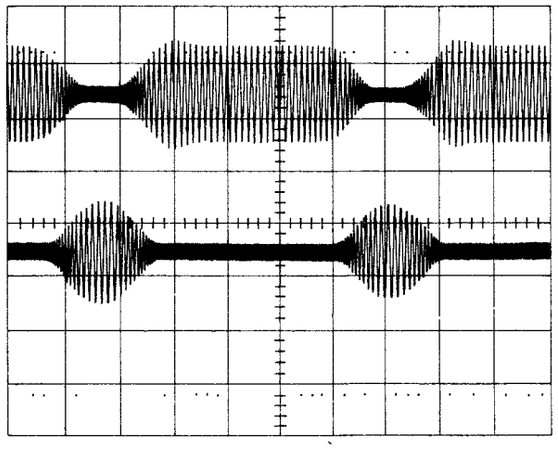
THIS WAVEFORM ILLUSTRATES THE TWO COMPONENT FREQUENCIES OF THE RX FSK BEING CHOPPED BY THE SELECTED A OR Z FREQUENCY THIS WAVEFORM IS TYPICAL OF THE A OR Z CHANNEL MIXED OUTPUTS

WAVEFORM 'B'
AMPLITUDE 500 mV/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER



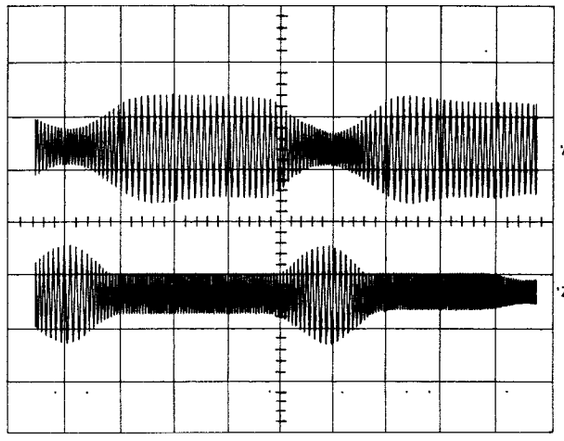
THIS WAVEFORM ILLUSTRATES THE RESPONSE OF THE A AND Z WIDE FILTERS TO THE 6.8KHz I.F. NOTE THE SHARP RISE IN THE LEADING EDGE OF THE ENVELOPE THIS TYPIFIES THE RESPONSE OF A WIDE FILTER. WHEN TWO BEAMS ARE USED, THE MARK/SPACE RELATIONSHIP BETWEEN THE A AND Z CHANNELS CAN BE CLEARLY DEFINED.

WAVEFORM 'C'
AMPLITUDE 500mV/DIV
TIMEBASE 10mS/DIV
INTERNAL TRIGGER



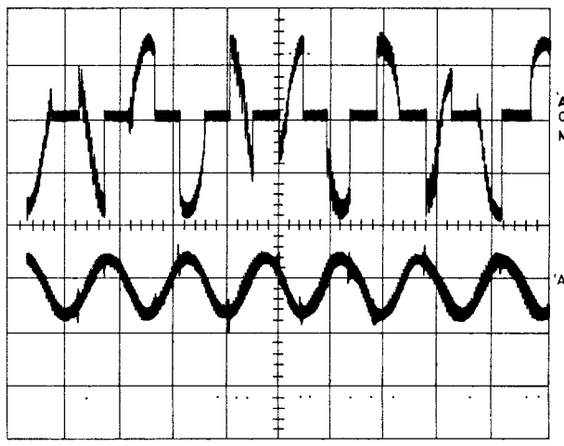
THIS WAVEFORM ILLUSTRATES THE RESPONSE OF THE A AND Z NORMAL FILTERS TO THE 6.8KHz I.F. TWO BEAMS MAY BE USED TO DISPLAY THE MARK SPACE RELATIONSHIP BETWEEN 'A' AND 'Z' CHANNELS

WAVEFORM 'D'
AMPLITUDE 500mV/DIV
TIMEBASE 10 mS/DIV
INTERNAL TRIGGER



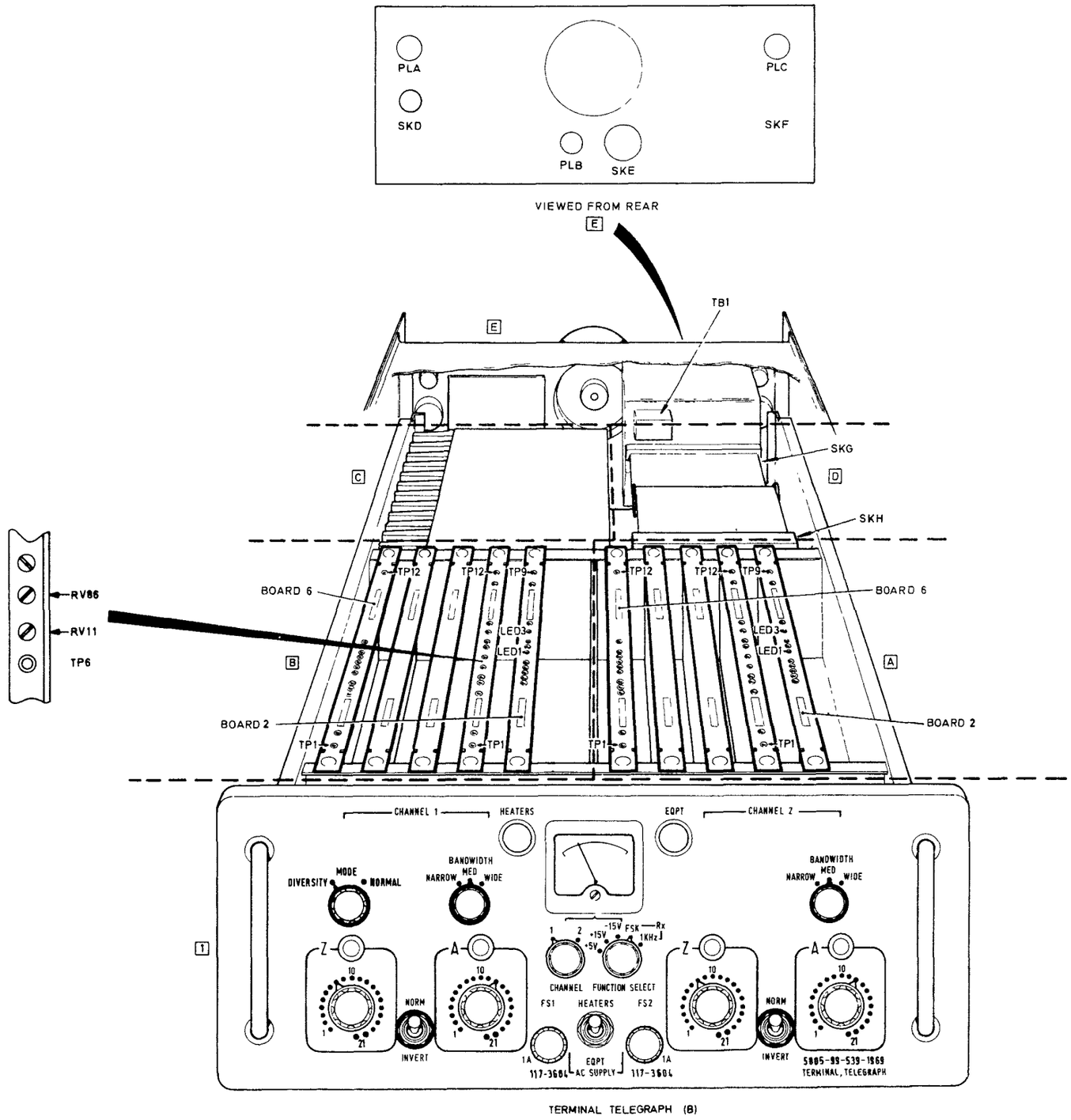
THIS WAVEFORM ILLUSTRATES THE RESPONSE OF THE 'A' AND 'Z' NARROW FILTERS TO THE 2805Hz I.F. TWO BEAMS MAY BE USED TO DISPLAY THE MARK SPACE RELATIONSHIP BETWEEN THE 'A' AND 'Z' CHANNELS

WAVEFORM 'E'
AMPLITUDE 2V/DIV
TIMEBASE TYPICALLY 100µS/DIV
INTERNAL TRIGGER

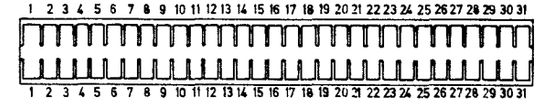


THIS WAVEFORM ILLUSTRATES THE INPUT AND OUTPUT OF THE 'A' CHANNEL MIXING IN THE 'NARROW' MODE

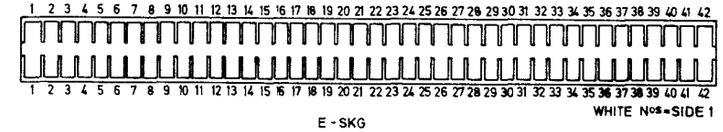
F1	Rx TRAFFIC PROCESSING (B)
	TDC SHEET 3 OF 3



TERMINAL TELEGRAPH (B)

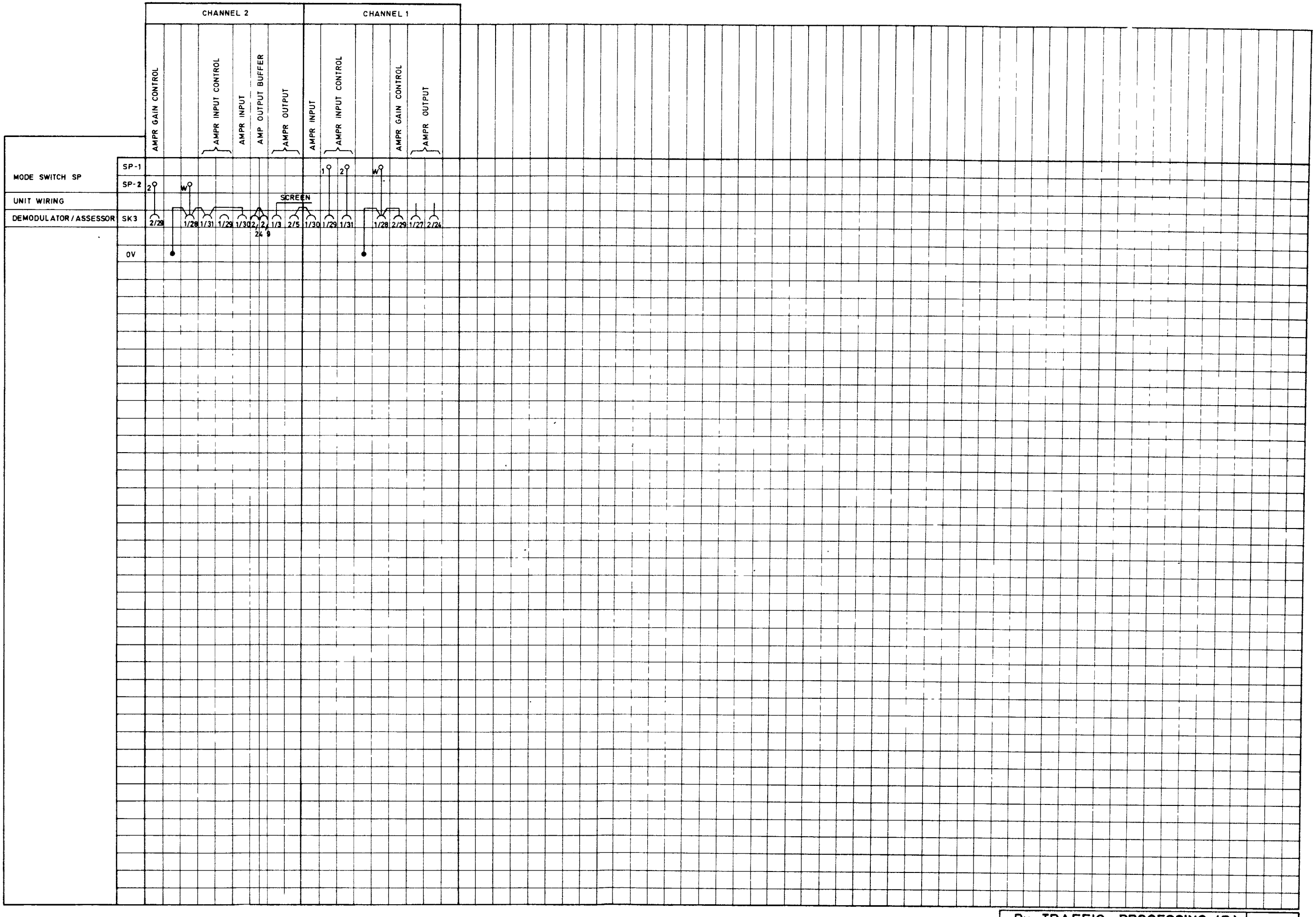


A - SK2-6
B - SK2-6



E - SKG
D - SKH

RX TRAFFIC PROCESSING (B)	F1
LOD	



Rx TRAFFIC PROCESSING (B)	F1
SI	

CHANNEL 2

Rx TRAFFIC (TELEGRAPH)
Rx FSK INPUT
F1
−15V
+15V
+5V
0V
CHANNEL 2 D.C. SUPPLIES
M (POWER SUPPLIES)
TD2
TD3
TD4
TD5
TD6
TD1
SF 1/W
SF 2/W
METER AMP IN
ELECTRONIC SWITCH
REPL
RECTIFICATION AND AMPLIFICATION. SELECTED CHANNEL 2 SIGNALS ARE RECTIFIED AND AMPLIFIED PRIOR TO BEING APPLIED AS MONITORING SIGNALS TO THE FRONT-PANEL METER
SK2 2/29
SK2 2/28
SK2
A
METER AMP OUT
TD7
SF 3/W
TD11
CHL 2 METER INPUT
SELECTED +5V
SELECTED +15V
SELECTED −15V
R7 10K
R8 30K
R9 30K
TD10
TD9
TD8
ATTENUATED +5V
ATTENUATED +15V
ATTENUATED −15V
SF 4/W
SE 1/W
SELECTED METER INPUT
CHANNEL SE
TD12
METER INDICATION
SE 2/W

CHANNEL 1

Rx TRAFFIC (TELEGRAPH)
Rx FSK INPUT
F1
−15V
+15V
+5V
0V
CHANNEL 1 D.C. SUPPLIES
M (POWER SUPPLIES)
TD2
TD3
TD4
TD5
TD6
TD1
SF 5/W
SF 6/W
METER AMP IN
ELECTRONIC SWITCH
REPL
RECTIFICATION AND AMPLIFICATION. SELECTED CHANNEL 1 SIGNALS ARE RECTIFIED AND AMPLIFIED PRIOR TO BEING APPLIED AS MONITORING SIGNALS TO THE FRONT-PANEL METER.
SK2 2/29
SK2 2/28
SK2
B
METER AMP OUT
TD7
SF 7/W
TD11
CHL 1 METER INPUT
SELECTED +5V
SELECTED +15V
SELECTED −15V
R12 10K
R13 30K
R14 30K
TD10
TD9
TD8
ATTENUATED +5V
ATTENUATED +15V
ATTENUATED −15V
SF 8/W
SE 2/W
FUNCTION SELECT
SF
−15V
FSK
Rx
+15V
+5V
1kHz

F2	METER MONITORING (B)
	FBD + BT

	INPUTS							FUNCTION SELECT SWITCH	ELEC' SWITCH	R9 (R14)	R8 (R13)	R7 (R12)	FUNCTION SELECT SWITCH	CHL S/W	OUTPUT METER
									REPL						
								1	1A2(1B2)	1	1	1	1	1	1
	0V		Rx TRAFFIC (TELEGRAPH)	Rx FSK INPUT	-15V	+15V	+5V	SF-1 (SF-5) / SF-2 (SF-6)	RECTIFICATION & AMPLIFICATION / METER AMP OUTPUT	RESISTOR (-15V) / ATTENUATED -15V	RESISTOR (+15V) / ATTENUATED +15V	RESISTOR (+5V) / ATTENUATED +5V	SF-3 (SF-7) AND SF-4 (SF-8) / CHL 2 (CHL 1) METER INPUT	SE SET TO CHL 2 (CHL 1)	METER / METER INDICATION
TEST DATA No	1		2	3	4	5	6		7	8	9	10	11		12
	PCD		A	A	A	A	A								
SET FUNCTION SELECT SWITCH TO +5V												PCD	PCD		MON
SET FUNCTION SELECT SWITCH TO +15V											PCD		PCD		MON
SET FUNCTION SELECT SWITCH TO -15V										PCD			PCD		MON
SET FUNCTION SELECT SWITCH TO Rx - FSK AND MODE SWITCH TO NORMAL									PCD				PCD		MON
SET FUNCTION SELECT SWITCH TO Rx - 1KHz AND MODE SWITCH TO NORMAL									PCD				PCD		MON
1. SET CHANNEL SWITCH TO CHANNEL 1 OR 2 AS REQUIRED.															

NOTE REFERENCES IN PARENTHESES ARE UNIQUE TO CHANNEL 1

METER MONITORING (B) | F2
MDC

TD	SIGNAL TITLE	MAIN MEASURING POINTS				ALTERNATIVE MEASURING POINTS				TEST EQUIPMENT		PROCEDURES	INDICATIONS
		AVAIL ACCESS	AT	WITH RESPECT TO	LOC	AVAIL ACCESS	AT	WITH RESPECT TO	LOC	IDENTITY	SETTING		
1	0V	PCD										VALID IF TD2 TO TD8 IS VALID	
2	Rx TRAFFIC (TELEGRAPH)	A	SF1/5 (SF5/5)	SF4/5 (SF8/5)						OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM D
3	Rx FSK INPUT	A	SF1/4 (SF5/4)	SF4/4 (SF8/4)						OSCILLOSCOPE (ITEM 3)			SEE WAVEFORM A, B & C
4	−15V	A	SF1/3 (SF5/3)	SF3/3 (SF7/3)						MULTIMETER (ITEM 1)	30V DC RANGE		−15V ±0·75V
5	+15V	A	SF1/2 (SF5/2)	SF4/2 (SF8/2)						MULTIMETER (ITEM 1)	30V DC RANGE		+15V ±0·75V
6	+5V	A	SF1/1 (SF5/1)	SF4/1 (SF8/1)						MULTIMETER (ITEM 1)	30V DC RANGE		+5V ±0·25V
7	METER AMP OUTPUT	PCD										SIGNAL PRESENT IF TD14 IS VALID	
8	ATTENUATED −15V	PCD										SIGNAL PRESENT IF TD14 IS VALID	
9	ATTENUATED +15V	PCD										SIGNAL PRESENT IF TD14 IS VALID	
10	ATTENUATED +5V	PCD										SIGNAL PRESENT IF TD14 IS VALID	
11	CHL2 (CHL1) METER INPUT	PCD										SIGNAL PRESENT IF TD14 IS VALID	
12	METER INDICATION	MON	METER ON FRONT PANEL									FUNCTION SWITCH SET TO +5V	METER SCALE 10V FSD AND READS 50% ±2DIV
												FUNCTION SWITCH SET TO +15V	METER SCALE 30V FSD AND READS 50% ±2DIV
												FUNCTION SWITCH SET TO −15V	METER SCALE −30V FSD AND READS 50% ±2DIV
												FUNCTION SWITCH SET TO Rx−FSK	METER READING BETWEEN 20% & 80% FSD WITH INCOMING TRAFFIC LEVEL
												FUNCTION SWITCH SET TO Rx−1KHz	METER READS 80% ±3DIV = SPACE / A 20% ±2DIV = MARK / Z
												FUNCTION SWITCH SET TO Tx−FSK	METER READS 80% FOR 0d Bm 20% FSD FOR ZERO
												FUNCTION SWITCH SET TO Tx−1KHz	METER READS 80% ±3 DIV = SPACE/A 20% ±2 DIV = MARK/Z
												NOTE REFERENCES IN PARENTHESIS ARE UNIQUE TO CHANNEL 1	

F2 METER MONITORING (B)
TDC SHEET 1 OF 2

PART 3B

SETTING UP AND PERFORMANCE TESTS

CONTENTS LIST

PART 3B

CHAPTER 1

GENERAL INFORMATION

CONTENTS

PART 3B

CHAPTER 1

GENERAL INFORMATION

INTRODUCTION

1. The aim of the checks described in Part 3B is to give a general indication of the performance and reliability of the Terminal Telegraph (T) and Terminal Telegraph (B). It is not intended that these checks should be used for fault diagnosis or for checking design specification.

TEST EQUIPMENT

2. The following items of test equipment are required for the checks.

(a) Multimeter AV08 (NSN 6625-99-105-7049)

(b) Frequency Counter CT576 (NSN 6625-99-522-6577)

(c) Digital Voltmeter CT469 (NSN 6625-99-552-3659)

(d) Signal Generator CT433 (NSN 6625-99-943-4059)

(e) Wattmeter Absorption AF CT44 (NSN 6625-99-949-0510)

(f) Oscilloscope Set CT531 (NSN 6625-99-199-2562)

Item (f) is not required for checking Terminal Telegraph (B).

PART 3B

CHAPTER 2

SETTING UP AND PERFORMANCE TESTS:

TERMINAL TELEGRAPH (T)

CONTENTS

TABLES

PART 3B

CHAPTER 2

SETTING UP AND PERFORMANCE TESTS:

TERMINAL TELEGRAPH (T)

ANTI-CONDENSATION HEATER CHECKS

1.(1) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

(2) Check that the HEATERS neon is illuminated and that all other lamps on the front panel are extinguished.

(3) Remove Fuse FS1 from the front panel and connect the Multimeter AV08, switched to the 1A a.c. current range, across the fuseholder terminals. The anti-condensation heater current should be between 110-180mA.

(4) Remove the multimeter, set the ship's Mains Supply switch for the Terminal Telegraph to the OFF position and replace FS1.

PSU CHECKS

2.(1) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

(2) Set the AC Supply switch to EQPT and check the following:

(a) The HEATERS neon is extinguished.

(b) The EQPT neon is illuminated.

(c) Air is flowing through the fan grill on the rear panel (indicating that the fan is operating).

(3) Set the Meter Function Select switch to the positions shown in Table 2.1 and check monitoring meter readings conform to the values given in the table.

(4) Set the Meter Channel switch to position 2.

(5) Set the Function Select switch to the positions specified in Table 2.1. Check monitoring meter readings conform to the values given in Table 2.1.

(6) Set the ship's Mains Supply switch for the Terminal Telegraph to the OFF position.

(7) Release the four unit securing screws on the front panel and extend the unit on its runners.

(8) Reset the drawer interlock switch at the TOP of the unit by setting the interlock plunger to its extended position.

(9) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

TABLE 2.1 MONITORING METER CHECKS

Function Select Switch Positions	Monitoring Meter Indications
+5V	mid-scale ±3 divisions
+15V	mid-scale ±3 divisions
-15V	mid-scale ±3 divisions

(10) Set the unit AC Supply front panel switch to EQPT position and check EQPT neon is illuminated.

(11) Set the Digital Voltmeter (CT469) controls as follows:

(a) Count Manual/Volts/Count Remote switch to VOLTS.

(b) Auto/Manual switch to AUTO.

(c) Resolve 1 and 2 to 1.

(d) Display X1, X2, X4 to X1.

(e) Filter switch to IN.

(f) Range switch to 20V.

(g) Power On Switch to ON.

(12) Using the Digital Voltmeter input lead monitor the voltages for Channel 1 as specified in Table 2.1.

NOTE PECs for Channel 1 are located in the left hand side of the unit directly behind the Channel 1 section of the front panel.

(13) Using the Digital Voltmeter, with controls set as in step(11), Monitor Channel 2 voltages as specified in Table 2.2.

NOTE PECs for Channel 2 are located in the right hand side of the unit directly behind the Channel 2 section of the front panel.

TABLE 2.2 VOLTAGE CHECKS

PEC and Location	Voltmeter Connections		Voltage Tolerance
	+ve	-ve	
Modulator Voice Frequency LOCATION 1	TP1	TP10	+ 4.75V - 5.25V
	TP3	TP10	14.25V - 15.75V
	TP4	TP10	-14.25V - -15.75V
Electronic Switch LOCATION 2	TP1	TP9	-14.25V - -15.75V
	TP5	TP9	14.25V - 15.75V
	TP6	TP9	4.75V - 5.25V
Demodulator Assessor LOCATION 3	TP2	TP13	14.25V - 15.75V
			4.25V - -15.75V

(Contd)

PEC and Location	Voltmeter Connections		Voltage Tolerance
	+ve	-ve	
Translator Signal Data LOCATION 6	TP1 TP2 TP10	TP12 TP12 TP12	4.75V - 5.25V 14.25V - 15.75V -14.25V - -15.75V

TRANSMIT FUNCTIONS

3. Frequency Checks

(1) Disconnected plugs PLF and PLD from sockets SKF and SKD on the rear panel.

(2) Set the unit AC Supply switch to the EQPT position.

(3) Set the Frequency Counter (CT576) controls as follows:

(a) Supply switch to A-FREQUENCY.

(b) Single shot/Sample Rate Control to SAMPLE RATE.

(c) Range Switch to kHz

(d) Input to 500μV

(e) Trigger slope +ve.

(f) Input lead to CHANNEL A.

(4) Set the meter channel switch to Channel 1 and the meter function switch to Tx-1kHz and confirm that the front panel monitoring meter reads 20% FSD ±2 divisions.

(5) Connect the signal input lead of the frequency counter and the signal input lead of the oscilloscope (CT531) to TP6 on Channel 1 Modulator Voice Frequency PEC (Location 1).

(6) Switch the Mode switch for Channel 1 to Tx and check Tx lamp (green) is illuminated. Set the A & Z switches for Channel 1 to the positions listed in Table 2.3 and check that the frequencies are within ±1Hz of those given in the table (unless otherwise specified in the table). Using the oscilloscope check the sinewave outputs are not distorted.

(7) Set Channel 1 A and Z switches to 1.

(8) Set the Signal Generator to 1kHz 0dBm and connect the signal generator output lead to pins J and T of SKF or SKD on the rear panel.

(9) Set Meter Function Selection switch to Tx-1kHz and check the front panel monitoring meter reads 80% FSD ±3 divisions.

TABLE 2.3 TP6 FREQUENCY CHECKS (MODULATOR VOICE FREQUENCY PEC)

A Switch Position	Z Switch Position	Frequency In kHz
1	1	0.425
1	2	0.595
1	3	0.765
1	4	0.935
1	5	1.105
1	6	1.275
1	7	1.445
1	8	1.615
1	9	1.785
1	10	1.955
1	11	2.125
1	12	2.295
1	13	2.465
1	14	2.635
1	15	2.805
1	16	2.975
17	18	0.500
18	17	0.700
19	20	1.575 } ±4Hz
20	19	2.425 }

(10) Set Channel 1 A and Z switches to the positions listed in Table 2.4 and check the frequencies conform to within ±1Hz of those given in the table (unless otherwise specified in the table). Using the oscilloscope check the sinewave outputs are not distorted.

TABLE 2.4 TP6 FREQUENCY CHECKS (MODULATOR VOICE FREQUENCY PEC)

A Switch Position	Z Switch Position	Frequency In kHz
1	1	0.425
2	1	0.595
3	1	0.765
4	1	0.935
5	1	1.105
6	1	1.275
7	1	1.445
8	1	1.615
9	1	1.785
10	1	1.955
11	1	2.125
12	1	2.295
13	1	2.465
14	1	2.635
15	1	2.805

A Switch Position	Z Switch Position	Frequency In kHz
16	1	2.975
17	18	0.500
18	17	0.700
19	20	1.575 } ±4Hz
20	19	2.425 }

(11) Carry out the frequency checks specified in Steps (1) to (10) on the relevant Channel 2 PECs. On completion of the frequency checks on Channel 2 disconnect the frequency counter, the oscilloscope, and signal generator.

4. Signal Level Checks

(1) Set the Unit AC Supply switch to EQPT.

(2) Set the Channel 1 mode switch to Tx and check that the Tx lamp (green) is illuminated.

(3) Set the Wattmeter Absorption AF (CT44) controls as follows:

(a) Power Range Milliwatts to 0dBm on the red scale.

(b) Impedance/Ohms Switch to 600ohms.

(4) Set the A and Z switches on the front panel to the frequency required.

(5) Remove SKT C (SKT A for Channel 2) from PLC (or PLA) on the rear panel and connect the wattmeter to pin D wrt E. Check that the wattmeter reading is 0dBm ±1dB.

(6) Set Meter Function Select switch to FSK Tx and check the front panel monitoring meter reading is 80 ±3 divisions.

(7) Repeat 4(1) to 4(6) for Channel 2.

RECEIVER FUNCTIONS

5. Frequency Checks

(1) Set the front panel switches as follows:

(a) MODE - Rx

(b) Bandwidth - MED

(c) Normal/Invert - NORMAL

(d) Meter Channel - 1 or 2 as required

(e) Meter Function - Rx RSK

(f) AC Supply - EQPT.

(2) Set the Frequency Counter (CT576) controls as follows:

(a) Supply switch to A-F1

(b) Single Shot/Sample Rate to Sample Rate

(c) Range Switch to kHz

(d) Input to 500μV

(e) Trigger slope to +ve

(f) Input lead to Channel A

(3) Connect the signal lead of the frequency counter to TP8 on the Translator Signal Data PEC (Location 6) and the earth lead to TP12.

(4) Set the A and Z switches to the positions listed in Table 2.5 and check that the frequency readings conform to within ±1Hz of those given in the table.

TABLE 2.5 TP8 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency In kHz
1	1	7.225
2	1	7.395
3	1	7.565
4	1	7.735
5	1	7.905
6	1	8.075
7	1	8.245
8	1	8.415
9	1	8.585
10	1	8.755
11	1	8.925
12	1	9.095
13	1	9.265
14	1	9.435
15	1	9.605
16	1	9.775
17	18	7.300
18	17	7.500
19	19	8.3725
20	19	9.2225
21	21	9.600

(5) Connect the frequency counter signal input lead to TP9 on the Translator Signal Data PEC (Location 6) and check that the frequencies are within ±1Hz of those listed in Table 2.6 for the A and Z switch positions.

TABLE 2.6 TP9 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency In kHz
1	1	7.225
1	2	7.395
1	3	7.565
1	4	7.735
1	5	7.905
1	6	8.075
1	7	8.245
1	8	8.415
1	9	8.585
1	10	8.755
1	11	8.925
1	12	9.095
1	13	9.265
1	14	9.435
1	15	9.605
1	16	9.775
17	17	7.300
17	18	7.500
19	19	8.3725
19	20	9.2225
21	21	7.800

6. Received Signal Checks

(1) Disconnect PLF and PLD from SKF and SKD on the rear panel and connect the Wattmeter Absorbtion AF (CT44) - set as in section 3-(14) - to SKF (SKD for channel 2) pin C w.r.t. pin P.

(2) If the Demodulator Assessor PEC (Location 3) of either channel has been replaced or interchanged in position, carry out section 6(3) next; if not, ignore section 6(3) and continue from 6 (4) onwards.

(3) To ensure that there are no input signals, disconnect the inputs from PLC and PLA on the rear panel. Monitor TP6 of Demodulator Assessor PEC with the positive lead of the Multimeter AV08, switched to the 2.5V d.c. voltage range. Connect the negative lead to TP18. Adjust RV11 of the Demodulator Assessor PEC - this control is situated between TP6 and TP7 (see F1 LOD) and is adjusted with a small screwdriver - until the multimeter reads 0V ±0.2V. Disconnect the multimeter.

(4) Set Signal Generator (CT433) controls to 425Hz 0dBm and connect signal generator output lead to pins A w.r.t. B of connector PLC on the rear panel (PLA for Channel 2).

(5) Set the front panel switches as in section 5(1). Set Z switch to 1 and A switch to 2. Check that the A lamp is OFF and the Z lamp is ON.

(6) Set Meter Function switch t 1 meter reads 20% FSD ±2 divisions.

(7) Set NORMAL/INVERT switch to INVERT. Check the Meter reads 80% FSD ±3 divisions Check the wattmeter reads 0dBm ±1dB. Reset switch to NORMAL.

(8) Set Meter Function Select switch to Rx-FSK and check the front panel monitoring meter reads 80 ±3 divisions.

(9) Set Z switch to 2 and A switch to 1. Check the A lamp is ON and the Z lamp is OFF.

(10) Set the Meter Function switch to Rx-1kHz. Check the meter reading is 80% FSD ±3 divisions.

(11) Set the NORMAL/INVERT switch to INVERT. Check the Meter reads 20% FSD ±2 divisions. Reset to Normal.

(12) Steps (1) to (11) may be repeated with the Wide or Narrow filters by selecting the appropriate bandwidth and A/Z switch positions and injecting the appropriate frequency as indicated by Table 2.7.

TABLE 2.7 BANDWIDTH CHECKS

Bandwidth	A/Z Switch Position	A/Z Frequency
WIDE	1 to 16	(255 + 170n) Hz A and Z frequencies separated by 510Hz or greater.
	19 to 20	1575Hz and 2425Hz
MED	1 to 16	(255 + 170n) Hz
	17 and 18	500Hz and 700Hz
	19 and 20	1575Hz and 2425Hz
NARROW	21	1042.5Hz and 957.5Hz
	A = 21, Z = 1 to 16 (n)	(255 + 170n) ±42.5Hz

OPERATING MODES

7.(1) Disconnect PLF and PLD from SKF and SKD and SKC and SKA from PLC and PLA on the rear panel.

(2) Set Signal Generator (CT433) controls to 425Hz 0dBm and connect signal generator output lead to pins A w.r.t. B of connector PLC on the rear panel (PLA for Channel 2).

(3) Set the Meter Channel switch to the channel to be monitored.
Set the Meter Function switch to Rx-1kHz.
Set the Mode switch to Tx.
Set the A switch to 1 and the Z switch to 2.
Set the Bandwidth switch to MED.
Set the Normal/Invert switch to Normal.
Set the AC supply switch to EQPT.

(4) Monitor TP6 on the Modulator Voice Frequency PEC (Location 1) with the input signal lead of the Frequency Counter (CT576) with the controls set as follows:

(a) Supply switch to A-Frequency.

(b) Single Shot/Sample Rate control to Sample Rate.

(c) Range switch to kHz.

(d) Input to 500μV.

(e) Trigger slope to +ve.

(f) Input lead to Channel A.

(5) Check that the Frequency Counter reads 0.595kHz, that the front panel meter indicates 20% FSD ±2 divisions, that the front panel Tx lamp is ON, and that the front panel Rx lamp is OFF.

(6) Set the Mode switch to Rx.

(7) Check that the Frequency Counter reads 0Hz, that the front panel meter indicates 80% FSD ±3 divisions, that the front panel Rx lamp is ON and that after approximately 3 seconds the front panel Tx lamp goes OFF.

(8) Set the Mode switch to AUTO.

(9) Check that the condition in section 7(7) remain unchanged.

(10) Disconnect the signal generator from PLC (PLA for channel 2) set it to 1kHz 0dBm and connect it to pin J w.r.t. pin T of SKF (SKD for channel 2).

(11) Check that the front panel Rx lamp is OFF and the front panel Tx lamp is ON. Check that the frequency counter reads 0.425kHz and the front panel meter indicates 20% FSD ±2 divisions.

(12) Connect TP6 on the Modulator Voice Frequency PEC (Location 1) to TP11 on the Translator Signal Data PEC (Location 6) and check that the conditions in 7(11) remain unchanged.

(13) Set the Mode switch to DUPLEX.

(14) Check that both the front panel Tx and Rx lamps are ON. Check that the front panel meter indicates 80% FSD ±3 divisions and the Frequency Counter reads 0.425kHz.

PART 3B

CHAPTER 3

SETTING UP AND PERFORMANCE TESTS: TERMINAL TELEGRAPH (B)

CONTENTS

TABLES

PART 3B

CHAPTER 3

SETTING UP AND PERFORMANCE TESTS:

TERMINAL TELEGRAPH (B)

ANTI-CONDENSATION HEATER CHECKS

1.(1) Set the ship's Mains Supply switch for the Telegraph Terminal to the ON position.

(2) Check that the HEATERS neon is illuminated and that all other lamps on the front panel are extinguished.

(3) Remove Fuse FS1 from the front panel and connect the Multimeter AV08, switched to the 1A a.c. current range, across the fuseholder terminals. The anti-condensation heater current should be between 110-180mA.

(4) Remove the multimeter, set the ship's Mains Supply switch for the Telegraph Terminal to the OFF position and replace FS1.

PSU CHECKS

2.(1) Check that the Mains Supply is connected to PLB on the rear of the modem.

(2) Set the ship's Mains Supply switch for the Telegraph Terminal to the ON position.

(3) Set the AC Supply switch to EQPT and check the following:

(a) The HEATERS neon is extinguished.

(b) The EQPT neon is illuminated.

(c) Air is flowing through the fan grill on the rear panel (indicating the fan is operating).

(4) Set the Meter Function Select switch to the positions shown in Table 3.1 and check monitoring meter readings conform to the values given in the table.

(5) Set the Meter Channel switch to position 2.

(6) Set the Meter Function select switch to the positions specified in Table 3.1. Check monitoring meter readings conform to the values given in Table 3.1.

(7) Set the ship's Mains Supply switch for the Telegraph Terminal to the OFF position.

(8) Release the four unit securing screws on the front panel and extend the unit on its runners.

TABLE 3.1 MONITORING METER CHECKS

Function Select Switch Positions	Monitoring Meter Readings
+5V	mid-scale ±3 divisions
+15V	mid-scale ±3 divisions
-15V	mid-scale ±3 divisions

(9) Reset the drawer interlock switch at the TOP of the unit by setting the interlock plunger to its EXTENDED position.

(10) Set the ship's Mains Supply switch for the Telegraph Terminal to the ON position.

(11) Set the Unit AC Supply front panel switch to EQPT position and check EQPT neon is illuminated.

(12) Set the Digital Voltmeter to:

(a) Count/Manual/Volts/Count Remote switch to VOLTS.

(b) Auto/Manual switch to AUTO.

(c) Resolve 1 and 2 to 1.

(d) Display X1, X2, X4 to X1.

(e) Filter switch to IN.

(f) Range switch to 20V (200V for the 80V measurement).

(g) Power On switch to ON.

(13) Using the Digital Voltmeter input lead monitor the voltages for Channel 1 as specified in Table 3.2.

NOTE PECs for Channel 1 are located in the left hand side of the unit directly behind the Channel 1 section of the front panel.

(14) Monitor Channel 2 voltages as specified in Table 3.2 using a digital voltmeter.

TABLE 3.2 VOLTAGE CHECKS

PEC and Location	Voltmeter Connections		Voltage Tolerance
	+ve	-ve	
Electronic Switch LOCATION 2	TP6	TP9	4.75V - 5.25V
	TP1	TP9	-14.25V - -15.75V
	TP5	TP9	14.25V - 15.75V
Demodulator Assessor LOCATION 3	TP2	TP13	14.25V - 15.75V
	TP4	TP13	-14.25V - -15.75V

(Contd)

TABLE 3.3 TP8 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	7.225
2	1	7.395
3	1	7.565
4	1	7.735
5	1	7.905
6	1	8.075
7	1	8.245
8	1	8.415
9	1	8.585
10	1	8.755
11	1	8.925
12	1	9.095
13	1	9.265
14	1	9.435
15	1	9.605
16	1	9.775
17	18	7.300
18	17	7.500
19	20	8.3725
20	19	9.2225
21	21	9.600

(5) Connect the frequency counter signal input lead to TP9 on the Translator Signal Data PEC (Location 6) and check that the frequencies are within ±1Hz of those listed in Table 3.4 for the A and Z switch positions.

TABLE 3.4 TP9 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	7.225
1	2	7.395
1	3	7.565
1	4	7.735
1	5	7.905
1	6	8.075
1	7	8.245
1	8	8.415
1	9	8.585
1	10	8.755
1	11	8.925
1	12	9.095
1	13	9.265
1		

(Contd)

PEC and Location	Voltmeter Connections		Voltage Tolerance
	+ve	-ve	
Translator Signal Data LOCATION 6	TP1 TP2 TP10	TP12 TP12 TP12	4.75V - 5.25V 14.25V - 15.75V -14.25V - -15.75V

RECEIVER FUNCTIONS

3. Frequency Checks

(1) Set the front panel switches to:

(a) Bandwidth - MED

(b) Normal/Invert - NORMAL

(c) Meter Channel - 1 or 2 as required

(d) Meter Function - Rx FSK

(e) Channel 1 MODE - NORMAL

(f) AC Supply - EQPT

(2) Set the Frequency Counter (CT576) controls to:

(a) Supply switch to A-FREQUENCY

(b) Single Shot/Sample Rate Control to SAMPLE RATE

(c) Range Switch to kHz

(d) Input to 500µV

(e) Trigger slope to +ve

(f) Input lead to Channel A

(3) Connect the signal lead of the frequency counter to TP8 on the Translator Signal Data PEC (Location 6) and the earth lead to TP12.

(4) Set the A and Z switches to the positions listed in Table 3.3 and check that the frequency readings are within ±1Hz of those given in the table.

A Switch Position	Z Switch Position	Frequency in kHz
1	15	9.605
1	16	9.775
17	18	7.300
18	17	7.500
19	20	8.3725
20	19	9.2225
21	21	7.800

4. Received Signal Checks - NORMAL MODE

(1) Remove PLF and PLD from SKF and SKD on the rear panel and connect the Wattmeter Absorbtion AF (CT44) - set to 600ohm 0dBm - to SKF (SKD for channel 2) pin B w.r.t. C.

(2) If the Demodulator Assessor PEC (Location 3) of either channel has been replaced or interchanged in position, carry out section 4(3) next, if not, ignore section 4(3) and continue from 4(4) onwards.

(3) To ensure that there are no input signals, disconnect the inputs from PLC and PLA on the rear panel. Monitor TP6 of Demodulator Assessor PEC with the positive lead of the Multimeter AV08, switched to the 2.5V d.c. voltage range. Connect the negative lead to TP18. Adjust RV11 of the Demodulator Assessor PEC - this control is situated between TP6 and TP7 (see F1 LOD) and is adjusted with a small screwdriver - until the multimeter reads 0V ±0.2V. Disconnect the multimeter.

(4) Set Signal Generator (CT433) controls to 425Hz 0dBm and connect signal generator output lead to signal input connector PLC pins E w.r.t. F on rear of unit. (PLA for Channel 2).

(5) Set the front panel switches as in section 3(1). Set Z switch to 1 and A switch to 2. Check that the A lamp is OFF and the Z lamp is ON.

(6) Set Meter Function switch to Rx-1kHz - Check the front panel meter reads 20% FSD ±2 divisions.

(7) Set NORMAL/INVERT switch to INVERT. Check that meter reads 80% FSD ±3 divisions.

(8) Set the Meter Function Select switch to FSK Rx and check the front panel monitoring meter reads 80 ±3 divisions.

(9) Set the Z switch to 2 and A switch to 1. Check that the A lamp is ON and the Z lamp is OFF.

(10) Set the Meter Function switch to Rx-1kHz and check that the reading is 80% FSD ±3 divisions.

(11) Set the NORMAL/INVERT switch to Invert. Check that the meter reads 20% FSD ±2 divisions. Reset to Normal.

(12) Steps 4(1) to 4(11) may be repeated with the Wide or Narrow filters by selecting the appropriate Bandwidth and A/Z switch positions and injecting the appropriate frequenc

TABLE 3.5 BANDWIDTH CHECKS

Bandwidth	A/Z Switch Position	Frequency
WIDE	1 to 16(n)	(255 + 170 n) Hz A and Z frequencies separated by 510Hz or greater.
	19 and 20	1575Hz and 2425Hz
MED	1 to 16(n)	(255 + 170n) Hz
	17 and 18	500Hz and 700Hz
	19 and 20	1575Hz and 2425Hz
NARROW	A=21, Z=1 to 16(n) A=Z = 21	(255 + 170n) ±42.5Hz 1042.5Hz and 957.5Hz

5. Received Signal Checks - DIVERSITY MODE

(1) Set the front panel switches to:

(a) MODE - DIVERSITY

(b) Channel 1 and 2 A switch - 1

(c) Channel 1 and 2 Z switch - 2

(d) Meter Channel switch - 1

(e) Meter Function switch - Rx - 1kHz

(f) Normal/Invert switches - Normal

(g) Bandwidth - MED

(h) AC Supply - EQPT

(2) If the Demodulator Assessor PEC (Location 3) of either channel has been replaced or interchanged in position carry out section 5(3) next, if not, ignore section 5(3) and continue from 5(4) onwards.

(3) To ensure that there are no input signals, disconnect the inputs from PLC and PLA on the rear panel.
Monitor TP6 Channel 1 Demodulator Assessor PEC (Location 3) with the positive lead of the Multimeter AV08, switched to the 2.5V d.c. voltage range. Connect the negative lead to TP18. Adjust RV86 of the Channel 1 Demodulator Assessor PEC, this control is situated between TP6 and TP7 (see F1 LOD) and is adjusted with a small screwdriver - until the multimeter reads 0V ±0.2V. Disconnect the multimeter. Reconnect the inputs to PLC and PLA.

(4) Set the Signal Generator (CT33) controls to 425Hz 0dBm and connect the signal generator output lead to BOTH signal input connector PLC and PLA pins E w.r.t. F on the rear panel.

(5) Check that the front panel meter indicates 80% FSD ±3 divisions.

(6) Set the Channel 1 A and Z switches to position 16. Check that the front panel meter indicates 80% FSD ±3 divisions.

(7) Set the Channel 2 A switch to position 2 and the Z switch to position 1. Check that the front panel meter indicates 20% FSD ±2 divisions.

(8) Set the Channel 1 A switch to position 1 and the Z switch to position 2 and set the Channel 2 A and Z switches to position 16. Check that the front panel meter indicates 80% FSD ±3 divisions.

(9) Set the Channel 1 A switch to position 2 and the Z switch to position 1. Check that the front panel meter indicates 20% FSD ±2 divisions.

PART 4

PLANNED MAINTENANCE

CONTENTS LIST

PART 4

CHAPTER 1

CLEANING AND INSPECTION OF FILTER

TERMINAL TELEGRAPH (T) AND (B)

CONTENTS

PART 4

CHAPTER 1

CLEANING AND INSPECTION OF FILTER: TERMINAL TELEGRAPH (T) AND (B)

TOOLS AND FACILITIES

1.(a) Screwdriver Flat Point 5/16 Point 6¼in. Overall 0276/910-5861.

GENERAL PREPARATION

2.(1) Set the local EQUIP/HEATERS switch on the front panel to HEATERS.

(2) Isolate the unit from the mains supplies.

(3) Release the four front panel fixing screws and withdraw the unit to the full extent of its runners. Check that the runner locking catches hold the drawer in the fully extended position.

(4) Rotate the two catches retaining the filter and lift the filter out of the unit.

CLEAN FILTER

3.(1) The filter should be inspected and replaced if damaged.

(2) Undamaged filters should be washed in a mild detergent, rinsed and excess moisture removed before replacement.

(3) After replacement rotate the retaining catches, close the drawer and secure the four retaining screws.

(4) Restore all supplies to the equipment.

(5) Restore the equipment to its former operational condition.

PART 4

CHAPTER 2

ELECTRICAL CHECKS

TERMINAL TELEGRAPH (T) : MEL 3513-172-1884

NSN 5805-99-539-1968

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TABLES

PART 4

CHAPTER 2

ELECTRICAL CHECKS

TERMINAL TELEGRAPH (T)

TEST EQUIPMENT

1. The following items of test equipment are required for the planned maintenance on the Terminal Telegraph (T):

(a)	Multimeter AV08 CT498A	(NSN 6625-99-105-7049)
(b)	Frequency Counter CT576	(NSN 6625-99-522-6577)
(c)	Wattmeter Absorption AF CT44	(NSN 6625-99-949-0510)
(d)	Oscilloscope Set CT531	(NSN 6625-99-199-2562)
(e)	Signal Generator CT433	(NSN 6625-99-943-4059)

PRIMARY SETTINGS

2.(1) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

(2) Set the unit front panel switches to:

(a) AC Supply switch to HEATERS.

(b) Meter Channel switch to 1.

(c) Meter Function Select switch to 5V.

(d) Channel 1 and 2 Mode switches to DUPLEX.

(e) Channel 1 and 2 Bandwidth switches to MED.

(f) Channel 1 and 2 Z switches to 1.

(g) Channel 1 and 2 A switches to 1.

(h) Channel 1 and 2 NORMAL/INVERT switches to NORMAL.

(3) Disconnect plugs PLF and PLD from sockets SKF and SKD on the rear panel.

(4) Disconnect sockets SKC and SKA from plugs PLC and PLA on the rear panel.

ANTI-CONDENSATION HEATER CHECKS

3.(1) Check that the front panel switches are set as specified in paragraph 2(2).

(2) Check that the HEATERS neon is illuminated and that all other lamps on the front panel are extinguished.

(3) Remove Fuse FS1 from the front panel and connect the Multimeter AV08, switched to the 1A a.c. current range, across the fuseholder terminals. The anti-condensation heater current should be between 110-180mA.

(4) Remove the multimeter, set the ship's Mains Supply switch for the Terminal Telegraph to the OFF position and replace FS1.

MONITOR AND MODE CHECKS

4.(1) Check that the front panel switches are as specified in paragraph 2(2).

(2) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

(3) Set the AC Supply switch to EQPT and check:

(a) The HEATERS neon is extinguished.

(b) The EQPT neon is illuminated.

(c) Air is flowing through the fan grill on the rear panel (indicating the fan is operating).

(d) All other lamps are extinguished.

(4) Set the Meter Function Select switch to the positions shown in Table 2.1 and check monitoring meter readings conform to the values given in Table 2.1.

TABLE 2.1 MONITORING METER CHECKS

Function Select Switch Positions	Monitoring Meter Readings
+5V	mid-scale ±3 divisions
+15V	mid-scale ±3 divisions
-15V	mid-scale ±3 divisions
Rx FSK	20 ±2 divisions
Rx 1kHz	20 ±2 divisions
Tx FSK	20 ±2 divisions
Tx 1kHz	20 ±2 divisions

(5) Reset the Meter Function Switch to 5V.

(6) Set the Meter Channel switch to position 2.

(7) Set the Function Select switch to the positions specified in Table 2.1. Check monitoring meter readings conform to the values given in Table 2.1.

(8) Reset Meter Function Select switch to 5V and the Meter Channel switch to 1.

(9) Set Channel 1 Mode switc[illegible] Table 2.2 and check that Channel 1 Tx lamp and Rx [illegible] nown in the table.

TABLE 2.2 Tx/Rx LAMP CHECKS

Mode Switch Positions	Tx & Rx Lamp States
BY-PASS	Rx lamp extinguished Tx lamp extinguished
Tx	Rx lamp extinguished Tx lamp illuminated
Rx	Tx lamp extinguished Rx lamp illiminated
AUTO	Tx & Rx lamps extinguished
DUPLEX	Rx lamp is extinguished Tx lamp is extinguished

(10) Using the Mode Switch for Channel 2 check that the states of the Tx and Rx lamps for Channel 2 conform to the states shown in Table 2.2.

FREQUENCY CHECKS

5.(1) Check the unit front panel switches are in the positions specified in paragraph 2(2) except for the unit AC Supply switch which is in the EQPT position.

(2) Set the Frequency Counter (CT576) controls to:

(a) Supply switch to A-FREQUENCY

(b) Single Shot/Sample Rate Control to SAMPLE RATE

(c) Range Switch to kHz.

(d) Input to 500µV

(e) Trigger slope +ve.

(f) Input lead to CHANNEL A

(3) Connect the signal lead of the frequency counter input lead to TP8 on the Channel 1 Translator Signal Data PEC (Location 6) and the earth lead to TP12.

(4) Set the A and Z switches for Channel 1 to the positions listed in Table 2.3 and check that the frequency readings are to within ±1Hz of those given in the table.

TABLE 2.3 TP8 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	7.225
2	1	7.395
3	1	7.565
4	1	7.735
5	1	7.905
6	1	8.075
7	1	8.245
8	1	8.415
9	1	8.585
10	1	8.755
11	1	8.925
12	1	9.095
13	1	9.265
14	1	9.435
15	1	9.605
16	1	9.775
17	18	7.300
18	17	7.500
19	19	8.3725
20	19	9.2225
21	21	9.600

(5) Connect the frequency counter signal input lead to TP9 on the Channel 1 Translator Signal Data PEC (Location 6) and check that the frequencies are within ±1Hz of those listed in Table 2.4 for the A and Z switch positions in Channel 1.

TABLE 2.4 TP9 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	7.225
1	2	7.395
1	3	7.565
1	4	7.735
1	5	7.905
1	6	8.075
1	7	8.245
1	8	8.415
1	9	8.585
1	10	8.755
1	11	8.925
1	12	9.095
1	13	9.265

(Contd)

A Switch Position	Z Switch Position	Frequency in kHz
1	14	9.435
1	15	9.605
1	16	9.775
17	17	7.300
17	18	7.500
19	19	8.3725
19	20	9.2225
21	21	7.800

(6) Connect the signal input lead of the frequency counter and the signal input lead of the oscilloscope (CT531) to TP6 on the Channel 1 Modulator Voice Frequency PEC (Location 1).

(7) Switch the Mode switch for Channel 1 to Tx and check Tx lamp is illuminated. Set the A and Z switches for Channel 1 to the positions listed in Table 2.5 and check that the frequencies are within ±1Hz of those given in the table. Using the oscilloscope check the sinewave outputs are not distorted.

TABLE 2.5 TP6 FREQUENCY CHECKS (MODULATOR VOICE FREQUENCY PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	0.425
1	2	0.595
1	3	0.765
1	4	0.935
1	5	1.105
1	6	1.275
1	7	1.445
1	8	1.615
1	9	1.785
1	10	1.955
1	11	2.125
1	12	2.295
1	13	2.465
1	14	2.635
1	15	2.805
1	16	2.975
17	18	0.500
18	17	0.700
19	20	1.5725
20	19	2.4225
21	1	0.3825
21	2	0.5525
21	3	0.7725
21	4	0.8925
21		

;d)

A Switch Position	Z Switch Position	Frequency inkHz
21	6	1.2325
21	7	1.4025
21	8	1.5725
21	9	1.7425
21	10	1.9125
21	11	2.0825
21	12	2.2525
21	13	2.4225
21	14	2.5925
21	15	2.7625
21	16	2.9325

(8) Set Channel 1 A and Z switches to 1.

(9) Set the Signal Generator CT433 to 1kHz 0dBm and connect the output lead to SKF (SKD for Channel 2) pin J w.r.t. pin T.

(10) Set Meter Function Selection switch to Tx-1kHz. Check the front panel monitoring meter reads 80% FSD ±3 divisions.

(11) Set Channel 1 A and Z switches to the positions listed in Table 2.6 and check the frequencies are within ±1Hz of those given in the table. Using the oscilloscope check the sinewave outputs are not distorted.

(12) On completion of the frequency checks on Channel 1 disconnect the test equipment.

(13) Carry out the frequency checks specified in steps (1) to (12) on the relevan Channel 2 PECs.

TABLE 2.6 TP6 FREQUENCY CHECKS (MODULATOR VOICE FREQUENCY PEC

A Switch Position	Z Switch Position	Frequency in kHz
1	1	0.425
2	1	0.595
3	1	0.765
4	1	0.935
5	1	1.105
6	1	1.275
7	1	1.445
8	1	1.615
9	1	1.785
10	1	1.955
11	1	2.125
12	1	2.295
13	1	2.465
14	1	2.635
15	1	2.805

(Contd)

A Switch Position	Z Switch Position	Frequency in kHz
16	1	2.975
17	18	0.500
18	17	0.700
19	20	1.5725
20	19	2.4225
21	1	0.4675
21	2	0.6375
21	3	0.8575
21	4	0.9775
21	5	1.1475
2		
21	6	1.3175
21	7	1.4875
21	8	1.6575
21	9	1.8275
21	10	1.9975
21	11	2.1675
21	12	2.3375
21	13	2.5075
21	14	2.6775
21	15	2.8475
21	16	3.0175

SIGNAL LEVEL CHECKS

6.(1) Check that unit front panel switches are in the positions specified, paragraph 2(2), except for the unit AC Supply switch which is in the EQPT position.

(2) Set Channel 1 modes switch to Tx and check that the Tx lamp is illuminated.

(3) Set the Wattmeter Absorption AF (CT44) controls to:

(a) Power Range Milliwatts to 0dBm on the red scale.

(b) Impedance/Ohms Switch to 600 ohms.

(4) Connect the wattmeter to TP6 w.r.t. TP10 on the Channel 1 Modulator Voice Frequency PEC (Location 1). Check that the Wattmeter reading is 0dBm ±1dB. Disconnect the wattmeter.

(5) Set Meter Function Select switch to Tx FSK and check the front panel monitoring meter reading is 80 ±3 divisions.

(6) Set Channel Mode switch to Rx and check Rx lamp is illuminated.

(7) Connect the wattmeter CT44 to TP3 w.r.t. TP9 on the Channel 1 Electronic Switch PEC (Location 2).

(8) Connect the Signal Generator (CT433), (600ohm balanced output), to pin A w.r.t. pin B of connector PLC on the rear panel (PLA for channel 2). Set the controls to give 425Hz +10Hz and -12dBm (0.194V rms) ±2dB.

(9) Set the Z switch to 1 and the A switch to 2. Check the Z lamp is illuminated and the A lamp is extinguished. Check that the Wattmeter reads zero.

(10) Set the Z switch to 2 and the A switch to 1. Check that the Z lamp is extinguished and the A lamp is illuminated. Check that the Wattmeter reads 0dBm ±1dB.

(11) Set the Z switch to 4 and the A switch to 1. Set the Bandwidth switch to WIDE. Check that the Z lamp is extinguished and the A lamp is illuminated. Check the Wattmeter reads zero.

(12) Set the Z switch to 1 and the A switch to 4. Check that the Z lamp is illuminated and the A lamp is extinguished. Check the Wattmeter reads 0dBm ±1dB.

(13) Set the Z switch to 1 and the A switch to 21. Set the Bandwidth switch to NARROW.

(14) Set the signal generator frequency to 467.5Hz ±10Hz. Check that the Z lamp is extinguished and the A lamp illuminated. Check the Wattmeter reads 0dBm ±1dB.

(15) Reset the signal generator frequency to 382.5Hz ±10Hz. Check that the Z lamp is illuminated and the A lamp extinguished. Check that the Wattmeter reads zero.

(16) Set the Meter Function switch to Rx - 1kHz and check the meter reads 20% FSD ±2 divisions.

(17) Set the NORMAL/INVERT switch to INVERT. Check the meter reads 80% FSD ±3 divisions. Reset switch NORMAL.

(18) Set the Signal Generator to 0dBm (0.775V rms) ±2dB. Set the Meter Function switch to Rx - FSK. Check the front panel meter reads 80 ±6 divisions.

(19) Set the Meter Channel switch to 2 and carry out the signal level checks specified in steps (1) to (18) on the relevant Channel 2 PEC using the Channel 2 controls.

(20) Disconnect the wattmeter and signal generator and reset all the unit front panel switches to the positions specified in paragraph 2(2).

PART 4

CHAPTER 3

ELECTRICAL CHECKS

TERMINAL TELEGRAPH (B) : MEL 3513-172-1885

NSN 5805-99-539-1969

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TABLES

PART 4

CHAPTER 3

TERMINAL TELEGRAPH (B)

TEST EQUIPMENT

1. The following items of test equipment are required for the planned maintenance on the Terminal Telegraph (B):

   (a) Multimeter AV08 CT498A (NSN 6625-99-105-7049)

   (b) Frequency Counter CT576 (NSN 6625-99-522-6577)

   (c) Signal Generator CT433 (NSN 6625-99-943-4059)

   (d) Wattmeter Absorption AF CT44 (NSN 6625-99-949-0510)

PRIMARY SETTINGS

2.(1) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

(2) Set the unit front panel switches as follows:

   (a) AC Supply switch to HEATERS

   (b) Meter Channel switch to 1

   (c) Meter Function Select switch to 5V

   (d) Channel 1 and 2 Bandwidth switches to MED

   (e) Mode Switch to NORMAL

   (f) Channel 1 and 2 Z switches to 1

   (g) Channel 1 and 2 A switches to 1

   (h) Channel 1 and 2 NORMAL/INVERT switch to NORMAL.

(3) Disconnect plugs PLF and PLD from sockets SKD and SKF on the rear panel.

(4) Disconnect sockets SKA and SKC from plugs PLA and PLC on the rear panel.

ANTI-CONDENSATION HEATER CHECKS

3.(1) Check that the front panel switches are set as specified in paragraph 2(2).

(2) Check that the HEATERS neon is illuminated and that all other lamps on the front panel are extinguished.

(3) Remove Fuse FS1 from the front panel and connect the Multimeter AV08, switched to the 1A a.c. current range, across the fuseholder terminals. The anti-condensation heater current should be between 110-180mA.

(4) Remove the multimeter, set the ship's Mains Supply switch for the Telegraph Terminal to the OFF position and replace FS1.

MONITOR CHECKS

4.(1) Check that the front panel switches are as specified in paragraph 2(2).

(2) Set the ship's Mains Supply switch for the Telegraph Terminal to the ON position.

(3) Set the AC Supply switch to EQPT and check:

(a) The HEATERS neon is extinguished

(b) The EQPT neon is illuminated

(c) Air is flowing through the fan grill on the rear panel (indicating the fan is operating)

(d) All other lamps are extinguished.

(4) Set the Meter Function Select switch to the position shown in Table 3.1 and check monitoring meter readings conform to the values given in the table.

TABLE 3.1 MONITORING METER CHECKS

Function Select Switch Positions	Monitoring Meter Indications
+5V	mid-scale ±3 divisions
+15V	mid-scale ±3 divisions
-15V	mid-scale ±3 divisions
Rx FSK	20 ±2 divisions
Rx 1kHz	20 ±2 divisions

(5) Reset the Meter Function Select Switch to 5V.

(6) Set the Meter Channel switch to position 2.

(7) Set the Meter Function Select switch to the positions specified in Table 3.1. Check monitoring meter readings conform to the values given in Table 3.1.

(8) Reset Meter Function Select switch to 5V and the Channel switch to 1.

FREQUENCY CHECKS

5.(1) Check the unit front panel switches are in the positions specified in paragraph 2(2) except for the unit AC Supply switch which is in the EQPT position.

(2) Set the Frequency Counter (CT576) controls to:

(a) Supply switch to A-FREQUENCY

(b) Single Shot/Sample Rate Control to SAMPLE RATE

(c) Range Switch to kHz

(d) Input to 500μV

(e) Trigger slope +ve

(f) Input lead to CHANNEL A

(3) Connect the signal lead of the frequency counter input lead to TP8 on the Channel 1 Translator Signal Data PEC (Location 6) and the earth lead to TP12.

(4) Set the A and Z switches for Channel 1 to the positions listed in Table 3.2 and check that the frequency readings are within ±1Hz of those given in the table.

TABLE 3.2 TP8 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	7.225
2	1	7.395
3	1	7.565
4	1	7.735
5	1	7.905
6	1	8.075
7	1	8.245
8	1	8.415
9	1	8.585
10	1	8.755
11	1	8.925
12	1	9.095
13	1	9.265
14	1	9.435
15	1	9.605
16	1	9.775
17	18	7.300
18	17	7.500
19	20	8.3725
20	19	9.2225
21	21	9.600

(5) Connect the frequency counter signal input lead to TP9 on the Channel Translator Signal Data PEC (Location 6) and check that the frequencies are within ±1Hz of those listed in Table 3.3 for the A and Z switch positions of Channel 1.

TABLE 3.3 TP9 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	7.225
1	2	7.395
1	3	7.565
1	4	7.735
1	5	7.905
1	6	8.075
1	7	8.245
1	8	8.415
1	9	8.585
1	10	8.755
1	11	8.925
1	12	9.095
1	13	9.265
1	14	9.435
1	15	9.605
1	16	9.775
17	18	7.300
18	17	7.500
19	20	8.3725
20	19	9.2225
21	21	7.800

(6) On completion of the frequency checks on Channel 1 disconnect the test equipment.

SIGNAL LEVEL CHECKS

6.(1) Check that the unit's front panel switches are in the positions specified in paragraph 2(2) except for the AC Supply switch which is in the EQPT position.

(2) Connect the Signal Generator (CT433), (600ohm balanced output), to pin E w.r.t. pin F of the rear panel connector PLC (PLA for Channel 2). Set the controls to give 425Hz ±10Hz and -12dBm (0.194V rms) ±2dB.

(3) Connect the Wattmeter (CT44) to TP3 w.r.t. TP9 on the Channel 1 Electronic Switch PEC (Location 2) set the wattmeter to 0dBm, 600ohms.

(4) Set the Modem channel 1 Z switch to 2 and the A switch to 1. Check the Z lamp is illuminated and the A lamp is extinguished. Check that the wattmeter reads zero.

(5) Set the Z switch to 2 and the A switch to 1. Check the Z lamp is extinguished and the A lamp is illuminated. Check that the wattmeter reads 0dBm ±1dB.

(6) Set the Z switch to 4 and the A switch to 1. Set the Bandwidth switch to WIDE. Check that the Z lamp is extinguished and the A lamp is illuminated. Check that the wattmeter reads 0dBm ±1dB.

(7) Set the Z switch to 1 and the A switch to 4. Check that the Z lamp is illuminated and the A lamp is extinguished. Check that the wattmeter reads zero.

(8) Set the Z switch to 1 and A switch 21. Set the Bandwidth switch to NARROW. Set the Signal Generator frequency to 467.5Hz ±10Hz. Check that the Z lamp is extinguished and the A lamp is illuminated. Check that the wattmeter reads 0dBm ±1dB.

(9) Reset the Signal Generator frequency to 382.5Hz ±10Hz. Check that the Z lamp is illuminated and the A lamp is extinguished. Check that the wattmeter reads zero.

(10) Reset the Signal Generator output level to 0dBm (0.775V rms) ±2dB. Set the Meter Function switch to Rx - FSK. Check that the front panel meter reads 80% FSD ±6 divisions.

(11) Set the Meter Function switch to Rx - 1kHz. Check that the front panel meter reads 20% FSD ±2 divisions.

(12) Set the Modem Normal/Invert switch to INVERT. Check that the meter reads 80% FSD ±3 divisions. Reset to NORMAL.

(13) Disconnect the Signal Generator from PLC (PLA for channel 2). Set the Meter Function switch to Rx - FSK. Check that the meter reads 20% FSD ±2 divisions.

(14) Set the Meter Channel switch to 2 and carry out the signal level checks specified in steps (2) to (13) on the channel 2 Modem using the relevant channel 2 controls.

DIVERSITY CHECKS

7.(1) Set the Modem controls to:

(a) AC Supply switch to EQPT.

(b) Meter Channel switch to 1.

(c) Meter Function switch to Rx - 1kHz

(d) Channel 1 and 2 Bandwidth switches to MED

(e) Mode switch to DIVERSITY

(f) Channel 1 and 2 Z switches to 1

(g) Channel 1 and 2 A switches to 2

(h) Channel 1 Normal/Invert switch to NORMAL.

(2) Connect the Signal Generator (CT433), (600ohms balanced output), to pin E w.r.t. pin F of the rear panel connector PLC. Set the controls to give 425Hz ±10Hz and -12dBm (0.194V rms) ±2dB. Check that the channel 1 Z lamp is ON and that the A lamp and channel 2 A and Z lamps are extinguished. Check that the front panel meter indicates 20% FSD ±2 divisions.

(3) Set the channel 1 Z switch to 2 and the A switch to 1. Check that the channel 1 Z lamp is extinguished and the A lamp is illuminated. Check the front panel meter indicates 80% FSD ±3 divisions.

(4) Move the Signal Generator output connection from PLC pins E and F to PLA pins E and F. Check that the channel 2 Z lamp is illuminated and that A lamp and channel 1 A and Z lamps are extinguished. Check that the front panel meter indicates 20% FSD ±2 divisions.

(5) Set the channel 2 Z switch to 2 and the A switch to 1. Check that the channel 1 Z lamp is extinguished and the A lamp is illuminated. Check the front panel meter indicates 80% FSD ±2 divisions.

(6) Disconnect the Signal Generator.

PART 4

CHAPTER 4

CLEANING, INSPECTION AND LUBRICATION:

TERMINAL TELEGRAPH (T) AND (B)

CONTENTS

PART 4

CHAPTER 4

CLEANING, INSPECTION AND LUBRICATION:

TERMINAL TELEGRAPH (T) AND (B)

STORES AND SPARES

1.(a)	Grease XG274	0473/220-3057
(b)	Switch cleaning and lubricating fluid ZX33	0473/220-2568

TOOLS AND FACILITIES

2.(a)	Screwdriver, flat point, 5/16in. point, 6.1/4 in.overall	0276/910-5861
(b)	Screwdriver, flat point, instrument, blade 10in. x 3/16in. point.	0276/910-5880
(c)	Screwdriver, flat point, instrument, blade 3.1/2in. x 1/8in. point.	0276/910-5872
(d)	Blower, electric, portable (vacuum cleaner)	0565/944-1946
(e)	Brush paint, round, square edge sash tool 1in. (soft brush).	0476/943-0413
(f)	Clean rag.	

GENERAL PREPARATION

3.(1) Set the Equipment/Heater changeover switch on the front panel to HEATERS.

(2) Isolate all power supplies to the unit.

(3) Release the four screws retaining the drawer and withdraw the unit to the full extent of its runners. Check that the runner locking latches hold the drawer in the fully extended position.

CLEAN AND INSPECT THE UNIT

4.(1) Remove all dust from the unit using the soft brush and vacuum cleaner.

(2) Visually inspect all components, wiring, soldered joints, printed circuit boards, and insulated surfaces for damage or deterioration. Inspect the printed circuit board terminal pads and if necessary clean the pins using a piece of india rubber.

(3) Check the condition of wiring terminations and that plugs and sockets are secured correctly.

(4) Check that all sub-units and screening covers are firmly secured.

LUBRICATE THE UNIT

5.(1) Check the physical operation of all switches and controls and that the associated knobs are secured to their shafts.

(2) Lightly lubricate all exposed switch contacts with switch cleaning and lubricate flux ZX33, operating the switches for even lubrication.

(3) Clean the drawer runners with clean rag removing all the old grease. Lightly lubricate with grease XG274.

(4) On completion close the drawer and secure the four retaining screws.

(5) Restore all supplies to the equipment.

(6) Restore the equipment to its previous operational condition.

PART 4

CHAPTER 5

REPLACEMENT OF FAN:

TERMINAL TELEGRAPH (T) AND (B)

CONTENTS

PART 4

CHAPTER 5

REPLACEMENT OF FAN:

TERMINAL TELEGRAPH (T) AND (B)

STORES AND SPARES

1.(a) Fan - Mini Boxer MWS2107F

TOOLS AND FACILITIES

2.(a) Screwdriver flat point, 5/16 point 6.1/4in. overall. 0276/910-5861

(b) Screwdriver flat point, instrument blade 3.1/2in. x 1/8in. point 0276/910-5872

GENERAL PREPARATION

3.(1) Isolate all power supplies to the unit.

(2) Disconnect the 608 connectors at the rear of the unit.

(3) Release the 8 off fixing screws at the front of the unit and remove the unit from the rack.

FAN REPLACEMENT

4.(1) Release the 18 fixing screws around the periphery of the rear panel and hinge the panel down on its lower edge.

(2) Remove the four fixing screws retaining the fan to the rear panel and disconnect at the terminal block.

(3) Remove the fan and remove the finger guard fitted thereto.

(4) Fit new fan using the four fixing screws and reconnect to the terminal block.

(5) Reassemble the rear panel to unit by securing the 18 fixing screws.

(6) Fit finger guard removed from discarded fan.

(7) Replace the unit in the rack and secure the 8 fixing screws.

(8) Restore all supplies to the equipment.

(9) Restore the equipment to its former operational condition.

PART 5

PARTS LIST

TERMINAL TELEGRAPH(T):TERMINAL TELEGRAPH(B)

CONTENTS LIST

PARTS LIST

TERMINAL TELEGRAPH (T) NSN 5805-99-539-1968

NOTE Before ordering parts, refer to relevant E List and BR 1923 - Substitution Guide.

Cct Ref	NATO Stock No/ Catalogue No	Item Name and Description	Maker's Part No/ Drawing No	No Off
1A1,1B1	5805-99-537-0866	Modulator Voice Frequency	3513-147-0994	2
1A2,1B2	5805-99-527-8235	Electronic Switch	3513-145-7694	2
1A3,1B3	5805-99-537-0864	Demodulator Assessor	3513-147-0974	2
1A4,1B4	5915-99-527-8233	Filter Bandpass (Narrow Shift)	3513-145-7674	2
1A5,1B5	5915-99-527-8232	Filter Bandpass (Wide Shift)	3513-145-7664	2
1A6,1B6	5805-99-537-0863	Translator Signal Data	3513-147-0964	2
1C	5805-99-529-9548	Power Supply (5V, ±15V)	3513-172-1537	1
1E1	5820-99-539-1971	Filter Radio Interference	3513-147-1884	1
1E2	5820-99-539-1970	Filter Radio Interference	3513-147-1874	1
1E3		Fan	3513-020-4591	1
FS1,FS2	5920-99-117-3604	Fuse 3A	Beswick TDA 156-3A	2
LP3-10	6240-99-995-9182	Lamp, Filament 28V, 40mA	2413-533-00123	8
LP1,LP2	6240-99-996-2110	Lamp, Neon	2422-475-00216 Hivac 10L	2
		Air Filter	3513-132-3696	1

PARTS LIST

TERMINAL TELEGRAPH (B) NSN 5805-99-539-1969

NOTE Before ordering parts, refer to relevant E List and BR 1923 - Substitution Guide

Cct Ref	NATO Stock No/ Catalogue No	Item Name and Description	Maker's Part No/ Drawing No	No Off
1A2,1B2	5805-99-527-8235	Electronic Switch	3513-145-7694	2
1A3,1B3	5805-99-537-0864	Demodulator Assessor	3513-147-0974	2
1A4,1B4	5915-99-537-8233	Filter Bandpass (Narrow Shift)	3513-147-7674	2
1A5,1B5	5915-99-537-8232.	Filter Bandpass (Wide Shift)	3513-147-7664	2
1A6,1B6	5805-99-537-0863	Translator Signal Data	3513-147-0964	2
1C	5805-99-529-9548	Power Supply (5V, ±15V)	3513-172-1537	1
1E1	5820-99-539-1971	Filter Radio Interference	3513-147-1884	1
1E2	5820-99-539-1970	Filter Radio Interference	3513-147-1874	1
1E3		Fan	3513-020-4591	1
FS1,FS2	5920-99-117-3604	Fuse 3A	Beswick TDA 156-3A	2
LP7-10	6240-99-995-9182	Lamp, Filament 28V, 40mA	2413-533-00123	4
LP1-LP2	6240-99-996-2110	Lamp, Neon	2422-475-00216	2
		Air Filter	3513-132-3693	1

PART 6

PREPARATION FOR ACCEPTANCE

CONTENTS LIST

PART 6

CHAPTER 1

PREPARATION FOR ACCEPTANCE

TERMINAL TELEGRAPH (T): MEL 3513-172-1884

NSN 5805-99-539-1968

CONTENTS

TABLES

PART 6

CHAPTER 1

TERMINAL TELEGRAPH (T): MEL3513-172-1884

NSN 5805-99-539-1968

TEST EQUIPMENT

1. The following items of test equipment are required for the initial checks on the Terminal Telegraph (T):

(a)	Multimeter AV08	(NSN 6625-99-105-7049)
(b)	Frequency Counter CT576	(NSN 6625-99-522-6577)
(c)	Wattmeter Absorption AF CT44	(NSN 6625-99-949-0510)
(d)	Digital Voltmeter CT469	(NSN 6625-99-522-3659)
(e)	Oscilloscope Set CT531	(NSN 6625-99-199-2562)
(f)	Signal Generator CT433	(NSN 6625-99-943-4059)

PRIMARY SETTINGS

2.(1) Check that the ship's 115V 60Hz Mains Supply switch for the Terminal Telegraph is in the OFF position.

(2) Disconnect socket SKB from PLB on the rear panel of the unit and remove fuses FS1 and FS2 from the front panel.

(3) Connect Multimeter AV08 (switched to the AC 250V range) to pins B and C of socket SKB.

(4) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position and check that the multimeter reads 115V ±10V.

(5) Set the ship's Mains Supply switch for the Terminal Telegraph to the OFF position and disconnect the multimeter.

(6) Connect socket SKB to PLB on the rear panel of the unit.

(7) Set the unit front panel switches as follows:

(a) AC Supply switch to HEATERS

(b) Meter Channel switch to 1

(c) Meter Function Select switch to 5V

(d) Channel 1 and 2 Mode switches to DUPLEX

(e) Channel 1 and 2 Bandw

(f) Channel 1 and 2 Z switches to 1.

(g) Channel 1 and 2 A switches to 1

(h) Channel 1 and 2 NORMAL/INVERT switches to NORMAL

(8) Replace FS1 and FS2 (3A fuses NSN 5999-99-117-3604) in the front panel.

(9) Disconnect plugs PLD and PLF from the rear panel sockets SKD and SKF.

(10) Disconnect sockets SKA and SKC from the rear panel plugs PLA and PLC.

ANTI-CONDENSATION HEATER CHECKS

3.(1) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

(2) Check that the HEATERS neon is illuminated and that all other lamps on the front panel are extinguished.

(3) Remove Fuse FS1 from the front panel and connect the Multimeter AV08, switched to the 1A a.c. current range, across the fuseholder terminals. The anti-condensation heater current should be between 110-180mA.

(4) Remove the multimeter, set the ship's Mains Supply switch for the Terminal Telegraph to the OFF position and replace FS1.

INITIAL SWITCHING ON CHECKS

4.(1) Check that the front panel switches are as specified in paragraph 2(7).

(2) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

(3) Set the AC Supply switch to EQPT and check the following:

(a) The HEATERS neon is extinguished.

(b) The EQPT neon is illuminated.

(c) Air is flowing through the fan grill on the rear panel (indicating the fan is operating).

(d) All other lamps are extinguished.

(4) Set the Meter Function Select switch to the positions shown in Table 1.1 and check monitoring meter readings conform to the values given in the table.

(5) Reset the Meter Function switch to 5V.

(6) Set the Meter Channel switch to position 2.

(7) Set the Function Select switch to the positions specified in Table 1.1. Check monitoring meter indications conform to the values given in Table 1.1.

TABLE 1.1 MONITORING METER CHECKS

Function Select Switch Positions	Monitoring Meter Indications
+5V	mid-scale ±3 divisions
+15V	mid-scale ±3 divisions
-15V	mid-scale ±3 divisions
Rx FSK	20 ±2 divisions
Rx 1kHz	20 ±2 divisions
Tx FSK	20 ±2 divisions
Tx 1kHz	20 ±2 divisions

(8) Reset Meter Function Select switch to 5V and the Meter Channel switch to 1.

(9) Set Channel 1 Mode switch to the positions shown in Table 1.2 and check that Channel 1 Tx lamp and Rx lamp conform to the states shown in the table.

TABLE 1.2 Tx/Rx LAMP CHECKS

Mode Switch Positions	Tx & Rx Lamp States
AUTO	Tx & Rx Lamps extinguished
Rx	Tx lamp extinguished Rx lamp illuminated
Tx	Rx lamp extinguished Tx lamp illuminated
DUPLEX	Rx lamp extinguished After approx. 3 seconds Tx lamp is extinguished

(10) Using the Mode Switch for Channel 2 check that the states of the Tx and Rx lamps for Channel 2 conform to the states shown in Table 1.2.

VOLTAGE CHECKS

5.(1) Set the ship's Mains Supply switch for the Terminal Telegraph to the OFF position.

(2) Release the four unit securing screws on the front panel and extend the unit on its runners.

(3) Reset the drawer interlock switch at the TOP of the unit by setting the interlock plunger to its extended position.

(4) Check the unit front panel switches are in the positions specified in paragraph 2(7).

(5) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

(6) Set the unit AC Supply front panel switch to EQPT position and check EQPT neon is illuminated.

(7) Set the Digital Voltmeter (CT496) controls to:

(a) Count Manual/Volts/Count Remote switch to VOLTS

(b) Auto/Manual switch to AUTO

(c) Resolve 1 and 2 to 1

(d) Display X1, X2, X4 to X1

(e) Filter switch to IN

(f) Range switch to 20V

(g) Power On Switch to ON

(8) Using the Digital Voltmeter input lead monitor the voltages for Channel 1 as specified in Table 1.3

NOTE PECs for Channel 1 are located in the left hand side of the unit directly behind the Channel 1 section of the front panel.

TABLE 1.3 VOLTAGE CHECKS

PEC and Location	Voltmeter Connections		Voltage Tolerance
	+ve	-ve	
Modulator Voice Frequency	TP1	TP10	4.75V - 5.25V
LOCATION 1	TP3	TP10	14.25V - 15.75V
	TP4	TP10	-14.25V - -15.75V
Electronic Switch	TP1	TP9	-14.25V - -15.75V
LOCATION 2	TP5	TP9	14.25V - 15.75V
	TP6	TP9	4.75V - 5.25V
Demodulator Assessor	TP2	TP13	14.25V - 15.75V
LOCATION 3	TP4	TP13	-14.25V - -15.75V
Translator Signal Data	TP1	TP12	4.75V - 5.25V
LOCATION 6	TP2	TP12	14.25V - 15.75V
	TP10	TP12	-14.25V - -15.75V

(9) Using the Digital Voltmeter, with controls set as in step (5) Monitor Channel 2 voltages as specified in Table 1.3.

NOTE PECs for Channel 2 are located in the right hand side of the unit directly behind the Channel 2 section of the front panel.

FREQUENCY CHECKS

6.(1) Check the unit front panel switches are in the positions specified in paragraph 2(7) except for the unit AC Supply switch which is in the EQPT position.

(2) Set the Frequency Counter (CT576) controls to:

(a) Supply switch to A-FREQUENCY

(b) Single Shot/Sample Rate Control to SAMPLE RATE

(c) Range Switch to kHz

(d) Input to 500μV

(e) Trigger slope +ve

(f) Input lead to CHANNEL A

(3) Connect the signal lead of the frequency counter input lead to TP8 on the Channel 1 Translator Signal Data PEC (Location 6) and the earth lead to TP12.

(4) Set the A and Z switches for Channel 1 to the positions listed in Table 1.4 and check that the frequency readings are within ±1Hz of those given in the table.

TABLE 1.4 TP8 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	7.225
2	1	7.395
3	1	7.565
4	1	7.735
5	1	7.905
6	1	8.075
7	1	8.245
8	1	8.415
9	1	8.585
10	1	8.755
11	1	8.925
12	1	9.095
13	1	9.265
14	1	9.435
15	1	9.605
16	1	9.775
17	18	7.300
18	17	7.500
19	19	8.3725
20	19	9.2225
21	21	9.600

(5) Connect the frequency counter signal input lead to TP9 on the Channel 1 Translator Signal Data PEC (Location 6) and check that the frequencies are within ±1Hz of those listed in Table 1.5 for the A and Z switch positions of Channel 1.

TABLE 1.5 TP9 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	7.225
1	2	7.395
1	3	7.565
1	4	7.735
1	5	7.905
1	6	8.075
1	7	8.245
1	8	8.415
1	9	8.585
1	10	8.755
1	11	8.925
1	12	9.095
1	13	9.265
1	14	9.435
1	15	9.605
1	16	9.775
17	17	7.300
17	18	7.500
19	19	8.3725
19	20	9.2225
21	21	7.800

(6) Connect the signal input lead of the frequency counter and the signal input lead of the oscilloscope (CT531) to TP6 w.r.t. TP10 on the Channel 1 Modulator Voice Frequency PEC (Location 1).

(7) Switch the Mode switch for Channel 1 to Tx and check that Tx lamp is illuminated. Set the A and Z switches for Channel 1 to the positions listed in Table 1.6 and check that the frequencies are within ±1Hz of those given in table. Using the oscilloscope check that the sinewave outputs are not distorted.

(8) Set Channel 1 A and Z switches to 1.

(9) Set the signal generator (CT433) to 1kHz, 0dBm and connect it to SKF (SKD for Channel 2) pin J w.r.t. pin T.

(10) Set Meter Function Selection switch to Tx-1kHz and confirm the front panel monitoring meter reads 80% FSD ±3 divisions.

TABLE 1.6 TP6 FREQUENCY CHECKS (MODULATOR VOICE FREQUENCY PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	0.425
1	2	0.595
1	3	0.765
1	4	0.935
1	5	1.105
1	6	1.275
1	7	1.445
1	8	1.615
1	9	1.785
1	10	1.955
1	11	2.125
1	12	2.295
1	13	2.465
1	14	2.635
1	15	2.805
1	16	2.975
17	18	0.500
18	17	0.700
19	20	1.5725
20	19	2.4225
21	1	0.3825
21	2	0.5525
21	3	0.7725
21	4	0.8925
21	5	1.0625
21	6	1.2325
21	7	1.4025
21	8	1.5725
21	9	1.7425
21	10	1.9125
21	11	2.0825
21	12	2.2525
21	13	2.4225
21	14	2.5925
21	15	2.7625
21	16	2.9325

(11) Set Channel 1 A and Z switches to the positions listed in Table 1.7 and check the frequencies conform to within ±1Hz of those given in the table. Using the oscilloscope check the sinewave outputs are not distorted.

(12) On completion of the frequency checks on Channel 1 disconnect the test equipment.

TABLE 1.7 TP6 FREQUENCY CHECKS (MODULATOR VOICE FREQUENCY PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	0.425
2	1	0.595
3	1	0.765
4	1	0.935
5	1	1.105
6	1	1.275
7	1	1.445
8	1	1.615
9	1	1.785
10	1	1.955
11	1	2.125
12	1	2.295
13	1	2.465
14	1	2.635
15	1	2.805
16	1	2.975
17	18	0.500
18	17	0.700
19	20	1.5725
20	19	2.4225
21	1	0.4675
21	2	0.6375
21	3	0.8575
21	4	0.9775
21	5	1.1475
21	6	1.3175
21	7	1.4875
21	8	1.6575
21	9	1.8275
21	10	1.9975
21	11	2.1675
21	12	2.3375
21	13	2.5075
21	14	2.6775
21	15	2.8475
21	16	3.0175

(13) Carry out the frequency checks specified in steps (1) to (11) on the relevant Channel 2 PECs. On completion of the frequency checks on Channel 2 disconnect the frequency counter, oscilloscope and signal generator.

SIGNAL LEVEL CHECKS

7.(1) Check that unit front panel switches are in the positions specified, paragraph 2(7), except for the unit AC Supply switch which is in the EQPT position. Disconnect PLC and PLA from the rear panel connectors SKC and SKA.

(2) Set Channel 1 mode switch to Tx and check that the Tx lamp is illuminated.

(3) Set the Wattmeter Absorption AF (CT44) controls as follows:

(a) Power Range Milliwatts to 0dBm on the red scale.

(b) Impedance/Ohms Switch to 600ohms.

(4) Connect the wattmeter to TP6 w.r.t. TP10 on the Channel 1 Modulator Voice Frequency PEC (Location 1). Check that the Wattmeter reading is 0dBm ±1dB. Disconnect the wattmeter.

(5) Set Meter Function Select switch to Tx FSK and check the front panel monitoring meter reading is 80% FSD ±3 divisions.

(6) Set Channel Mode switch to Rx and check Rx lamp is illuminated.

(7) Connect the Signal Generator (CT433), (600ohm balanced output), to pin A w.r.t. pin B of connector PLC on the rear panel (PLA for Channel 2). Set the controls to give 425Hz ±10Hz and -12dBm (0.194V rms) ±2dB.

(8) Connect the wattmeter, set to 0dBm 600ohms, to TP3 w.r.t. TP9 of Electronic Switch PEC Location 2.

(9) Set the Z switch to 1 and the A switch to 2. Check that the Z lamp is illuminated and the A lamp is extinguished. Check the wattmeter reads zero.

(10) Set the Z switch to 2 and the A switch to 1. Check that the Z lamp is extinguished and the A lamp is illuminated. Check the wattmeter reads 0dBm ±1dB.

(11) Set the Z switch to 4 and the A switch to 1. Set the Bandwidth switch to WIDE. Check the Z lamp is extinguished and the A lamp is illuminated. Check the wattmeter reads 0dBm ±1dB.

(12) Set the Z switch to 1 and the A switch to 4. Check that the Z lamp is illuminated and the A lamp is extinguished. Check the wattmeter reads zero.

(13) Set the Meter Function switch to Rx 1kHz. Check that the front panel meter reads 20% FSD ±2 divisions.

(14) Set the Normal/Invert switch to INVERT. Check the meter reads 80% FSD ±3 divisions. Reset switch to NORMAL.

(15) Set the signal generator to 382.5Hz ±10Hz, -12dBm. Set the A switch to 21 and the Z switch to 1. Set the Bandwidth switch to NARROW. Check the Z lamp is illuminated and the A lamp is extinguished. Check the wattmeter reads zero.

(16) Set the signal generator to 467.5Hz ±10Hz. Check the A lamp is illuminated and the Z lamp is extinguished. Check the wattmeter reads 0dBm ±1dB.

(17) Set the Signal Generator to 0dBm (0.775V rms) ±2dB. Set the Meter Function switch to Rx-FSK. Check that the front panel meter reads 80 ±6 divisions.

(18) Set the Meter Channel switch to 2 and carry out the signal level checks specified in steps (1) to (17) on the relevant Channel 2 PECs using the Channel 2 controls.

(19) Disconnect the wattmeter and signal generator and reset all the unit front panel switches to the positions specified in paragraph 2(7).

PART 6

CHAPTER 2

PREPARATION FOR ACCEPTANCE

TERMINAL TELEGRAPH (B): MEL 3513-172-1885

NSN 5805-99-539-1969

CONTENTS

TABLES

PART 6

CHAPTER 2

TERMINAL TELEGRAPH (B): MEL 3513-172-1885

NSN 5805-99-539-1969

TEST EQUIPMENT

1. The following items of test equipment are required for the initial checks on the Terminal Telegraph (B):

   (a) Multimeter AV08 (NSN 6625-99-105-7049)

   (b) Frequency Counter CT576 (NSN 6625-99-522-6577)

   (c) Digital Voltmeter CT469 (NSN 6625-99-522-3659)

   (d) Signal Generator CT433 (NSN 6255-99-943-4059)

   (e) Wattmeter Absorption AF (CT44) (NSN 6625-99-949-0510)

PRIMARY SETTINGS

2.(1) Check that the ship's 115V 60Hz Mains Supply switch for the Terminal Telegraph is in the OFF position.

(2) Disconnect socket SKT B from PLB on the rear panel of the unit and remove fuses FS1 and FS2 from the front panel.

(3) Connect Multimeter AV08 (switched to the a.c. 250V range) to pins B and C of socket SKT B.

(4) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position and check that the multimeter reads 115V ±10V.

(5) Set the ship's Mains Supply switch for the Terminal Telegraph to the OFF position and disconnect the multimeter.

(6) Connect socket SKB to PLB on the rear panel of the unit.

(7) Set the unit front panel switches as follows:

   (a) AC Supply switch to HEATERS

   (b) Meter Channel switch to 1

   (c) Meter Function Select switch to 5V.

   (d) Channel 1 and 2 Bandwidth switches to MED.

   (e) Mode Switch to NORMAL

   (f) Channel 1 and 2 Z switches to 1

(g) Channel 1 and 2 A switches to 1

(h) Channel 1 and 2 NORMAL/INVERT switch to NORMAL.

(8) Replace FS1 and FS2 (3A fuse NSN 5999-99-117-3604) in the front panel.

(9) Disconnect plugs PLD and PLF from sockets SKD and SKF on the rear panel.

(10) Disconnect sockets SKA and SKC from plugs PLA and PLC on the rear panel.

ANTI-CONDENSATION HEATER CHECKS

3.(1) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

(2) Check that the HEATERS neon is illuminated and that all other lamps on the front panel are extinguished.

(3) Remove Fuse FS1 from the front panel and connect the Multimeter AV08, switched to the 1A a.c. current range, across the fuseholder terminals. The anti-condensation heater current should be between 110-180mA.

(4) Remove the multimeter, set the ship's Mains Supply switch for the Telegraph Terminal to the OFF position and replace FS1.

INITIAL SWITCHING ON CHECKS

4.(1) Check that the front panel switches are as specified in paragraph 2(7).

(2) Set the ship's Mains Supply switch for the Telegraph Terminal to the ON position.

(3) Set the AC Supply switch to EQPT and check the following:

(a) The HEATERS neon is extinguished

(b) The EQPT neon is illuminated

(c) Air is flowing through the fan grill on the rear panel (indicating the fan is operating)

(d) All other lamps are extinguished.

(4) Set the Meter Function Select switch to the positions shown in Table 2.1 and check monitoring meter readings conform to the values given in the table.

(5) Reset the Meter Function Select Switch to 5V.

(6) Set the Meter Channel switch to position 2.

(7) Set the Meter Function Select switch to the positions specified in Table 2.1. Check monitoring meter readings conform to the values given in Table 2.1.

(8) Reset Meter Function Select switch to 5V and the Channel switch to 1.

TABLE 2.1 MONITORING METER CHECKS

Function Select Switch Positions	Monitoring Meter Readings
+5V	mid-scale ±3 divisions
+15V	mid-scale ±3 divisions
-15V	mid-scale ±3 divisions
Rx-FSK	20 ±2 divisions
Rx-1kHz	20 ±2 divisions

VOLTAGE CHECKS

5.(1) Set the ship's Mains Supply switch for the Telegraph Terminal to the OFF position.

(2) Release the four unit securing screws on the front panel and extend the unit on its runners.

(3) Reset the drawer interlock switch at the TOP of the unit by setting the interlock plunger to its EXTENDED position.

(4) Check the unit front panel switches are in the positions specified in paragraph 2(7).

(5) Set the ship's Mains Supply switch for the Terminal Telegraph to the ON position.

(6) Set the Unit AC Supply front panel switch to EQPT position and check EQPT neon is illuminated.

(7) Set the Digital Voltmeter

(a) Count Manual/Volts/Count Remote switch to VOLTS

(b) Auto/Manual switch to AUTO

(c) Resolve 1 and 2 to 1

(d) Display X1, X2, X4 to X1.

(e) Filter switch to IN

(f) Range switch to 20V

(g) Power On switch to ON

(8) Using the Digital Voltmeter input lead monitor the voltages for Channel 1 as specified in Table 2.2.

NOTE PECs for Channel 1 are located in the left hand side of the unit directly behind the Channel 1 section of the front panel.

(9) Using the Digital Voltmeter, with controls set as in step (5), Monitor Channel 2 Voltages as specified in Table 2.2.

TABLE 2.2 VOLTAGE CHECKS

PEC and Location	Voltmeter Connections		Voltage Tolerance
	+ve	-ve	
Electronic Switch LOCATION 2	TP6	TP9	4.75V - 5.25V
	TP1	TP9	-14.25V - -15.75V
	TP5	TP9	14.25V - 15.75V
Demodulator Assessor LOCATION 3	TP2	TP13	14.25V - 15.75V
	TP4	TP13	-14.25V - -15.75V
Translator Signal Data LOCATION 6	TP1	TP12	4.75V - 5.25V
	TP2	TP12	14.25V - 15.75V
	TP10	TP12	-14.25V - -15.75V

FREQUENCY CHECKS

6.(1) Check the unit front panel switches are in the positions specified in paragraph 2(7) except for the unit AC Supply switch which is in the EQPT position.

(2) Set the Frequency Counter (CT576) controls to:

(a) Supply switch to A-FREQUENCY

(b) Single Shot/Sample Rate Control to SAMPLE RATE

(c) Range switch to kHz

(d) Input to 500µV

(e) Trigger slope +ve

(f) Input lead to CHANNEL A.

(3) Connect the signal lead of the frequency counter input lead to TP8 on the Channel 1 Translator Signal Data PEC (Location 6) and the earth lead to TP12.

(4) Set the A and Z switches for Channel 1 to the positions listed in Table 2.3 and check that the frequency readings conform to within ±1Hz of those given in the table.

TABLE 2.3 TP8 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	7.225
2	1	7.395
3	1	7.565
4	1	7.735

(Contd)

A Switch Position	Z Switch Position	Frequency in kHz
5	1	7.905
6	1	8.075
7	1	8.245
8	1	8.415
9	1	8.585
10	1	8.755
11	1	8.925
12	1	9.095
13	1	9.265
14	1	9.435
15	1	9.605
16	1	9.775
17	18	7.300
18	17	7.500
19	20	8.3725
20	19	9.2225
21	21	9.600

(5) Connect the frequency counter signal input lead to TP9 on the Channel Translator Signal Data PEC (Location 6) and check that the frequencies conform to within ±1Hz of those listed in Table 2.4 for the A and Z switch positions of Channel 1.

TABLE 2.4 TP9 FREQUENCY CHECKS (TRANSLATOR SIGNAL DATA PEC)

A Switch Position	Z Switch Position	Frequency in kHz
1	1	7.225
1	2	7.395
1	3	7.565
1	4	7.735
1	5	7.905
1	6	8.075
1	7	8.245
1	8	8.415
1	9	8.585
1	10	8.755
1	11	8.925
1	12	9.095
1	13	9.265
1	14	9.435
1	15	9.605
1	16	9.775
17	18	7.300

(Contd)

A Switch Position	Z Switch Position	Frequency in kHz
18	17	7.500
19	20	8.3725
20	19	9.2225
21	21	7.800

(6) On completion of the frequency checks on Channel 1 disconnect the test equipment.

(7) Carry out the frequency checks specified in steps (1) to (6) on the relevant Channel 2 PECs. On completion of the frequency checks on Channel 2 disconnect the frequency counter.

SIGNAL LEVEL CHECKS

7.(1) Check that the Unit's front panel switches are in the positions specified in paragraph 2(7), except for the AC Supply switch which is in the EQPT position.

(2) Connect the Signal Generator (CT433), (600ohms balanced output), to pin E w.r.t. pin F of the rear panel connector PLC (PLA for channel 2). Set the controls to give 425Hz ±10Hz and -12dBm (0.194V rms) ±2dB.

(3) Connect the Wattmeter (CT44) to TP3 w.r.t. TP9 on the Electronic Switch PEC, (Location 2).

(4) Set the Modem channel 1 Z switch to 1 and the A switch to 2. Check the Z lamp is illuminated and the A lamp is extinguished. Check the wattmeter reads zero.

(5) Set the Z switch to 2 and the A switch to 1. Check the Z lamp is extinguished and the A lamp is illuminated. Check the wattmeter reads 0dBm ±1dB.

(6) Set the Z switch to 4 and the A switch to 1. Set the Bandwidth switch to WIDE. Check the Z lamp is extinguished and the A lamp is illuminated. Check the wattmeter reads 0dBm ±1dB.

(7) Set the Z switch to 1 and the A switch to 4. Check the Z lamp is illuminated and the A lamp is extinguished. Check the wattmeter reads zero.

(8) Set the Z switch to 1 and the A switch to 21. Set the Bandwidth switch to NARROW. Set the Signal Generator frequency to 467.5Hz ±10Hz. Check the Z lamp is extinguished and the A lamp is illuminated. Check the wattmeter reads 0dBm ±1dB.

(9) Reset the Signal Generator frequency to 382.5Hz ±10Hz. Check the Z lamp is illuminated and the A lamp is extinguished. Check the wattmeter reads zero.

(10) Reset the Signal Generator output level to 0dBm (0.775V rms) ±2dB. Set the Meter Function switch to Rx-FSK. Check the front panel Meter reads 80 ±6 divisions.

(11) Set the Meter Function switch to Rx-1kHz and check the meter reads 20% FSD ±2 divisions.

(12) Set the Modem Normal/Invert switch to Invert. Check the meter reads 80% FSD ±3 divisions.

(13) Disconnect the Signal Generator from PLC (PLA for Channel 2). Set the Meter function switch to Rx-FSK. Check the meter reads 20 ±2 divisions.

(14) Set the Meter Channel switch to 2 and carry out the signal level checks specified in steps (2) to (13) on the Channel 2 Modem using the relevant Channel 2 controls.

DIVERSITY CHECKS

8.(1) Set the Modem controls as follows:

(a) AC Supply switch to EQPT.

(b) Meter Channel switch to 1.

(c) Meter Function switch to Rx-1kHz.

(d) Channel 1 and 2 Bandwidth switches to MED.

(e) Mode Switch to DIVERSITY.

(f) Channel 1 and 2 Z switches to 1.

(g) Channel 1 and 2 A switches to 2.

(h) Channel 1 Normal/Invert switch to NORMAL.

(2) Connect the Signal Generator (CT433), 600ohms balanced output), to pin E w.r.t pin F of the rear panel connector PLC. Set the controls to give 425Hz ±10Hz and -12dBm (0.194V rms) ±2dB. Check the Channel 1 Z lamp is illuminated and that the A lamp and Channel 2 A and Z lamps are extinguished. Check the front panel meter indicates 20% FSD ±2 divisions.

(3) Set the Channel 1 Z switch to 2 and the A switch to 1. Check that the Channel 1 Z lamp is extinguished and the A lamp is illuminated. Check the front panel meter indicates 80% FSD ±3 divisions.

(4) Move the Signal Generator output connection from PLC pins E and F to PLA pins E and F. Check the Channel 2 Z lamp is illuminated and that A lamp and Channel 1 A and Z lamps are extinguished. Check the front panel meter indicates 20% FSD ±2 divisions.

(5) Set the Channel 2 Z switch to 2 and the A switch to 1. Check the Channel 1 Z lamp is extinguished and the A lamp is illuminated. Check that the front panel meter indicates 80% FSD ±3 divisions.

(6) Disconnect the Signal Generator.