

MULTITONE PRODUCT AND SYSTEM INFORMATION

GENERAL

- 1.1 Multitone develop and manufacture selective call radio paging staff location systems with a wide range of types and facilities. This leaflet is a general guide to the systems available and is for use by those concerned in the sale of the products.

Further details are available from Multitone Technical Data Sheets and Equipment Handbooks. A summary of the history and development of the Multitone Electric Company is also available in the leaflet entitled "The Multitone Profile".

- 1.2 Equipment described in this leaflet is currently in production during April 1971.

U.K. REGULATIONS

- 2.1 All Multitone systems require a licence issued by the Ministry of Posts and Telecommunications (MPT). Licences permit a system to be used only within the boundaries of the premises concerned. For this reason the systems are generally called "on-site" systems. The MPT does not permit these systems to be used over public land. Therefore, systems requiring to cover two premises even where the premises are close enough to be covered by a single transmitter must have transmitters fitted in each site and be linked by land lines usually rented from the Post Office Corporation (POC).

- 2.2 Equipment connected to POC rented lines or equipment must have POC technical and commercial approval. Relevant equipment listed in the Multitone price list has these approvals.

- 2.3 Both authorities (MPT and POC) strictly enforce the regulations imposed upon these systems and all sales personnel should become thoroughly familiar with the licencing procedures and details.

SYSTEMS

- 3.1 Multitone offer the following systems.

3.1.1. ULTRASONIC SUPPRESSED CARRIER INDUCTION LOOP SYSTEM - (generally called "Loop" systems). The systems transmit signals through (a) cable (loop or) loops fitted around the premises to be covered and transmits at a carrier frequency of 35 KHz.

3.1.2. FREE RADIATING RADIO SYSTEM IN HIGH FREQUENCY (HF) BAND - (generally called "V.H.F." systems). The system transmits signals from a centrally mounted aerial on one of a choice of thirteen frequencies made available by the MPT. Multitone generally use the following frequencies. 26.978 MHz; 27.103 MHz; 27.262 MHz; and 31.75 MHz. The 31.75 MHz frequency is restricted to hospital use only and is used by all paging companies for most hospital systems by special consent of the MPT in order to avoid interference to paging system from diathermy (heat treatment) equipment widely used in hospitals. Diathermy equipment also operates on 27 MHz and has the effect of swamping radio signals using this frequency.

NOTE VOICE MESSAGES IN THESE FREQUENCIES ARE PROHIBITED BY THE MPT IN THE U.K. EXCEPT FOR EMERGENCY USE IN HOSPITALS.

3.1.3 FREE RADIATING ULTRA HIGH FREQUENCY RADIO SYSTEM (generally called "U.H.F." systems). They transmit on one of seven carrier frequencies allocated for this purpose, i.e. 458.85 MHz; 458.95 MHz; 459.05 MHz; 459.15 MHz; 459.25 MHz; 459.35 MHz; 459.45 MHz.

NOTE: VOICE MESSAGES FOLLOWING SELECTIVE CALL SIGNALS ARE PERMITTED ON THESE FREQUENCIES BY MPT U.K.

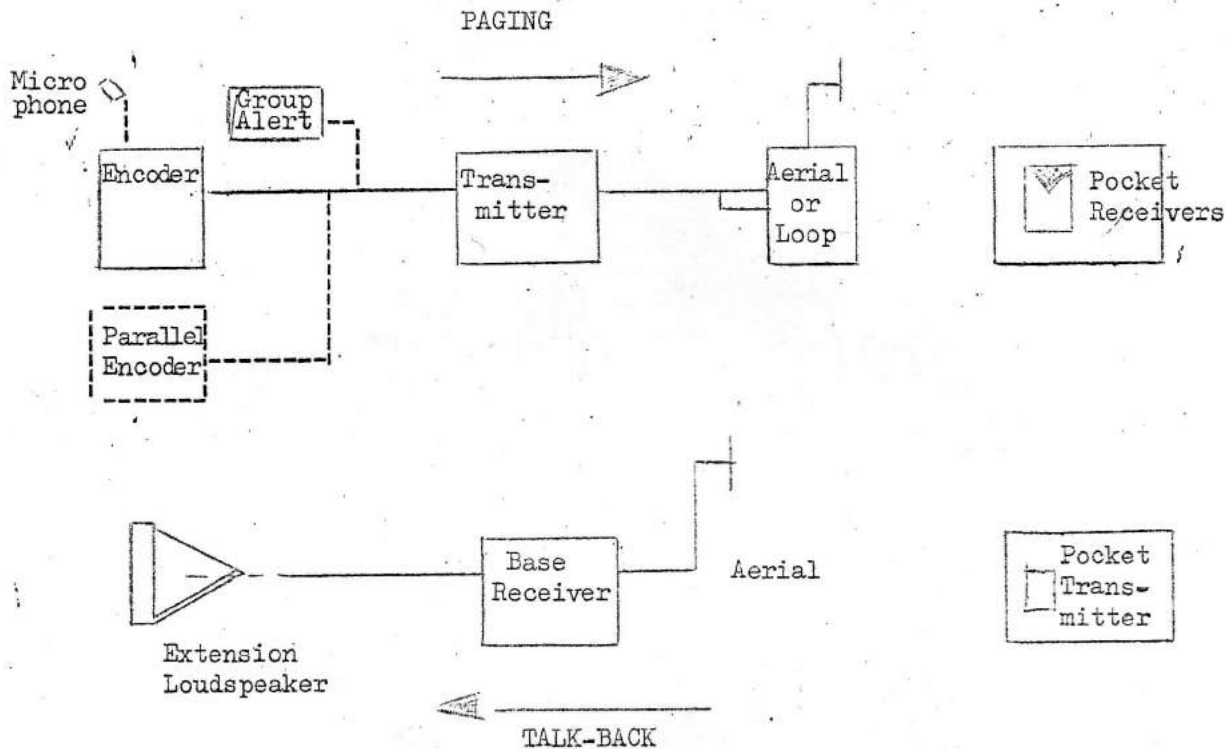
3.1.4 FREE RADIATING RETURN SPEECH RADIO SYSTEM - (generally called "Talk-Back" System). This system enables pocket transmitters to transmit voice messages to a base receiver. The systems operate on one of six frequencies of Multitone use 161.025 MHz; 161.050 MHz; 161.075 MHz; (V.H.F.).

SYSTEM SCHEMATIC

4.1 Multitone Paging and Talk back systems are built up from four separate component groups. Each group has a range of units which meet the various individual system requirements.

Continued...

The schematic arrangement of the build-up of these systems is as follows.



4.3 ENCODER/CONTROL UNITS

These units generate the audio tones which are passed to the transmitter to selectively call any receiver on the system. They are available in the following capacities.

<u>Loop</u>	<u>V.H.F./ (U.H.F.)</u>	<u>Capacity</u>
EC10S	EA10S (not U.H.F.)	24
EC9	EA9	59
EC11	EA11	240
EC8	EA8	100 or 538 or 870 (see notes below)

4.3 VOICE MESSAGES

Voice messages are available with all Multitone systems (note voice messages on V.H.F. systems are prohibited in the U.K. by MPT

continued

except for hospital use in emergencies).

The EA/EC10S encoders have built-in microphones and speech circuits and are not available as non speech units.

The EA/C9, EA/C11, EA/C8 have speech facilities available optionally by the addition of a speech circuit board and a separate desk microphone.

When specifying these units with speech facilities add the suffix "S" to the reference (e.g. EC9S; EC11S; EC8/100S).

4.4 CODED CALLS

Call signals of different speeds may be sent from any encoder. The EC/EA10S has manual coded calls enabling the operator to construct an indefinite number of codes and call durations.

The remaining encoders all provide two coded calls (standard and slow call). These calls are of pre-set duration from 5 to 16 seconds.

4.5 GROUP ALERT

This is a collective call facility additional to normal selective call. It is used to summon pre-determined groups of people collectively when required. It is used extensively in hospitals for cardiac arrest teams and other medical requirements and in industry for emergency, fire and police requirements.

On the EA/EC10S encoder it is provided by using a special pocket receiver equipped to signal collectively from call number 38 in addition to its own individual selective call number.

With the other encoders a separate group alert unit (GAC1 or GAA1) is fitted adjacent to the encoder. It has facilities to call either two teams of six receivers or one team of 12 receivers. An electronic protection against inadvertent use is provided. Special receivers are not required with this unit but receivers provided for group alert use are distinctively marked.

continued.

The group alert call signal is quite different from the standard two selective call codes and is clearly indicative of an emergency situation.

4.6 DOOR BELL FACILITY

When the encoder is not in use, usually after normal business hours, it is possible to connect an entrance door bell, or single night telephone line, or alarm from a continuously operating machine to this facility. A pre-determined receiver is called automatically when the device connected to the encoder is operated.

This facility is available on the EC/EALOS and the EC/EA9 only. If this facility is required with other encoders please consult the Engineering Department.

5.1 TRANSMITTERS

These units transmit a carrier frequency in to the aerial modulated with the audio tones and voice messages from the encoder.

5.2 STANDARD UNITS

For V.H.F. systems use transmitter TA8 - output 5 watts. This unit is used on most medium and large sites. For small sites use transmitter TA14 with $\frac{1}{2}$ watt output.

For loop systems use transmitter type TC3 with 10 watts output capable of driving up to 1600 yards of looping. Please refer to later notes on aerials.

NOTE (1) Most U.K. sites where a V.H.F. system is justified will be covered from one TA8 5 watt transmitter. On rare sites where more than one transmitter proves to be necessary the transmitters should be connected in a master/slave mode and the transmitters interconnected by co-axial cable type UR57. In these cases specify TA8MS and slave transmitters TA8/1. It is possible to use the TA8 and the TA14 together and this is sometimes

continued

required to fill in odd difficult spots or underground situations. Use master slave mode as detailed above and specify TA14/1.

- (2) Most loop sites are covered from one TC3 transmitter. The maximum total loop length permitted is approximately 1600 yards. No single loop length should exceed 800 yards and not more than three loops should be fitted to the TC3. Thus two loops of 800 yards is permissible as is three loops of 400 yards. But three loops of 800 yards and four loops of 200 yards are not permissible. Do not use more than one TC3 in any one system.

- (3) For systems needing more looping than one TC3 can provide specify transmitter type TC1. The specification is the same as the TC3 detailed above but this unit enables further transmitters (type TCRL and TCSRL) to be added.

The TC1 is the master (or first) transmitter.

The TCRL is the intermediate transmitter and the TCSRL is the last transmitter in the chain. There is no limit to the number of TCRL transmitters which may be used.

NOTE: In some cases two separate buildings may be looped and interconnected by landline. The TC3 transmitter may be used in each building under these circumstances but NO speech facilities are possible. If speech facilities are required under these circumstances specify TC1 and TCRL etc.

6.1 AERIALS

For V.H.F. systems use a half wave dipole aerial cut to the correct frequency length and mounted centrally on the site. Do not exceed an

continued

aerial height of greater than 50 feet without prior permission from MPT and avoid aerial heights of less than 20 feet. Remember that a V.H.F. half wave dipole aerial is 18 feet long. Fit the transmitter as close to the aerial as possible. Aerial cable distances in excess of 33 yards considerably attenuate the effective radiated power. There is no practical restriction to the distance between the encoder unit and the transmitter. *use cable*

For Loop systems consult the Engineering Department or study the Multitone "Guide to Looping" handbook.

In general terms the width of the loop should never exceed 20 yards. Where buildings require a greater loop width than this route the loop in a figure of eight pattern or use two loops dependent upon maximum loop length regulations. The building in which the loop is fitted absorbs the signal to a lesser or greater extent dependent upon the density of the type of building construction.

For lightly constructed buildings one horizontal loop should cover five floors. For medium density construction buildings one horizontal loop should cover three floors. For heavy buildings of concrete and reinforced steel, etc. one horizontal loop is needed for each floor.

As many factors contribute to signal absorption in buildings opinions of qualified personnel should be taken in all cases where doubt exists.

6.2. POCKET RECEIVERS

For loop systems the following receivers are available.

FOR EC10S SYSTEMS ONLY

RC24ST - quiet call

RC24STL - loud call

RC24STZ - quiet call, group alert facility

RC24STLZ - loud call, group alert facility

continued

FOR ALL OTHER ENCODERS

RC20ST - quiet call

RC20STL - loud call

RC65S - super loud call

All receivers are fitted to receive signal and voice.

All receivers use one disposable Mercury call except receiver RC65S which uses two cells. The operating life of these cells in all the above receivers is 12 weeks.

NOTE: The RC24 and the RC20 receiver range are not compatible.

Use the RC24 range with the EC10S encoder only. Do not use the RC20 range with the EC10S encoder.

It is not possible to use rechargeable cells with loop receivers.

V.H.F. POCKET RECEIVERS

The following receiver range is available.

<u>EA10S System</u>	<u>Other Encoders</u>		<u>Facilities</u>
RA64S	RA60S	Quiet call	Disposable or rechargeable cells
RA64SL	RA60SL	Loud call	Disposable or rechargeable cells
RA66S	RA61S	Quiet call plus lamp signal	Rechargeable cells only
	RA63S	Lamp only	Rechargeable cells only
RA69	RA65	Super loud call	Rechargeable cells only
RA64SZ		Quiet call	Group alert receiver
RA64SLZ		Loud call	Group alert receiver
RA66Z		Quiet call plus signal lamp	Rechargeable cells only

All receivers are fitted to receive signal and voice message

(N.B. voice messages are prohibited in V.H.F. systems by MPT U.K. except for hospital use in emergency).

continued

Where disposable mercury cells are used two cells are required in each receiver and they have a life of five weeks.

Where rechargeable cells are used two DEAC cells are required in each receiver and have an operating time of 168 hours (7 days) between charges.

The RA64 and RA60 receivers are not compatible. Use the RA64 receivers with the EA10S only. Do not use RA60 receivers with the EA10S.

CHARGING RACKS

Two charging racks are available for V.H.F. systems.

RSR11 20 way wall or desk mounted charging rack.

RSR12 20 way wall or desk mounted charging rack with indicator board switching facilities.

PS7 Power supply unit is needed to operate charging racks.

Use one PS7 for every group of five racks fitted. If more than one group of racks are required then one PS7 is used for each group up to a maximum of five racks in each group. The PS7 includes a timing unit to switch the rack on for a period of fourteen hours in every 168 hours.

Pocket receivers may be placed in the racks and charged with the cells in situ or the cells may be removed and charged separately in cassettes type RA60C. Special rack timers are available if required to meet unusual situations.

TALK-BACK

The return speech facility is provided by a completely independent system. It has no connection with any of the paging systems detailed above and may be used in conjunction with any of these systems.

The talk-back system comprises of pocket transmitters, a base receiver or receivers with aerials and optionally an extension loud-speaker.

continued

The pocket transmitters are reference type TB1 and type TB1X2. The TB1X2 is used in noisy situations and is designed to avoid transmitting side noises. Each pocket transmitter has a flexible aerial which should hang free and still when in use. The transmitters are operated by two disposable Mercury cells type TR152 and with the typical intermittent use will have a life of 2/3 months.

The base transmitter should be fitted close to the base aerial with an interconnecting cable of not longer than 33 yards. The base aerial should be centrally fitted in the site in a commanding position. The height of the aerial should not exceed 50 feet and should not be lower than 20 feet. The base receiver type TBR4 is fitted with its own loudspeaker and if the installation arrangements permit may stand alongside the encoder control unit. If it is not practical to fit the base receiver by the encoder control unit then extension loudspeakers either LS4 or LS5 should be fitted. The LS4 extension loudspeaker has no amplification and is therefore suitable for distances between the base receiver and the extension loudspeaker of 100 yards or less. The LS5 extension loudspeaker has amplification facilities and should be used where the distance is in excess of 100 yards.