

C-2000 Manual Addendum

C-2000 SF and EMSTEL Operation:

This manual addendum describes two modes of operation that are independent from normal C2000 Console operation.

These two modes are available only through factory activation by your trained customer service representative.

NOTE ONE: Refer to the C-2000 Technical Manual (Telex PN 0980380 4/24/2001 or newer) for the following new Setup States:

SF Mode Enable/Disable(18): Used to enable this mode of operation.

Ring Type Select(42): Select one of eight ring types.

EMSTEL Enable/Disable(43): Used to enable this mode of operation.

DTMF Sequence Entry(44): Programs DTMF sequences.

Ring Duration(45): Programs the ring duration.

DTMF Sequence Enable/Disable(46): Enables use of the programmed DTMF sequences.

NOTE TWO: SF mode has priority over EMSTEL mode. If both are enabled, the operation mode will be SF.

Operation Mode: Supervised four-wire EMRC version

Supervised four-wire EMRC version operates in a telephone station configuration with four wire analog supervision SF signaling.

The unit was designed to operate with industry standard four-wire SF to E&M facility equipment such as the Westell 4308-xx, 4306-00 or the Rockwell 7305-14 or equivalent network terminating equipment.

Loop-back and dial pulse correction are not available.

The normal operation of the SF device has an idle (on hook) tone sent in both directions on the four-wire circuit. The nominal level of the signaling tone is -20 dBm₀. A busy condition is indicated by a loss of the supervision tone. When the unit returns to the on-hook idle condition, the SF oscillator will provide a high-level guard tone at -8 dBm₀ for a period of 400 msec. The level will then drop to a level of -20 dBm₀. The SF tone generator is crystal-derived and stable to $\pm 0.01\%$.

The incoming voice frequency (VF) signal is applied to the SF detector. If 2600 Hz is present and is 12 dB higher in level than the VF level, the detector indicates that SF is present. If the VF level is too high (less than 8 dB below the 2600 Hz tone) or if 2600 Hz

tone is not present, the SF detector indicates SF is not present. SF tone as low as -43.5 dBm0 will be reliably detected, as long as receive circuit noise is less than 51 dBmC0. The nominal input level is -10 dBm0 (represents a nominal 10 dB line loss).

Supervised four-wire EMRC Feature Set:

- a) The device will produce and detect standard 2600 Hz single frequency (SF) signaling tone to provide the circuit supervision and signaling.
- b) A 500-msec. delay on the detection of a loss of SF tone on RX, will prevent false rings during short path fades and other intermittent outages.
- c) The SF transmit level is adjustable over a wide range (-30 to +10dB). The SF level and duration are adjusted by changing the Guard and Hold tone setup options respectively.
- d) During incoming calls, the SF tone will drop on the receive path. The unit provides a notch filter to the SF receive path to prevent voice components from falsing the SF detector.
- e) After detecting the loss of SF tone for a period of greater than 500 msec., the unit provides a ringing signal from the built in speaker. Eight different rings are provided (to differentiate from other devices) and the ringing level is independently adjustable via the normal volume control.
- f) A dry contact to indicate ringing condition is provided. This is used to drive external ring generators.
- g) A Monitor function is provided such that if the handset is off hook and a call is in progress the RX audio can be routed to the main speaker. This is accomplished by pressing the MON key.
- h) A handset with a push-to-talk (PTT) switch is provided. The handset shall use a standard four-conductor coil cord with RJ-9 modular connectors.
- i) The unit provides a balanced and protected 4-wire voice interface of 600 ohms.
- j) A logging audio output that normalizes and sums transmit and receive levels is provided on the Auxiliary output port.
- k) Line receive equalization is selectable for use with leased four-wire RTNV type Telco lines or private microwave network. This equalization shall provide for a high-end boost when used with Telco lines.
- l) Pre-programmed DTMF strings can be transmitted by pressing A,B,C or D. (Refer to C2000 Manual: DTMF Sequence Enable).
- m) The SF transmit level and the transmit voice audio level are independently adjustable. (Refer to C2000 Manual: Guard/Hold Tone level and TX Line Jack level)
- n) Volume controls for Ringing, Handset and Main speaker audio are independently adjustable.

General Operation:

Outgoing Call:

When the handset is taken offhook, the display will show "OC" for Outgoing Call. The 2600Hz tone will be removed from the TX output. A DTMF sequence or audio may be transmitted at this time.

Incoming Call:

When the 2600Hz tone is removed from RX in, the system will start the ring process and display "IC" for Incoming Call. The ring will continue until the handset is taken offhook or the 2600Hz tone is present on RX again. The volume of the ring can be adjusted only while the ring is occurring.

Call In Progress:

When the handset is offhook and the inbound 2600Hz tone is absent, the call status will be in progress. The display will show "CP" for Call In Progress.

No Call:

When the inbound RX 2600Hz tone is present and the handset is onhook, the call is terminated. The display will be blank and if the MON function was active prior to the Handset going back onhook, it will be deactivated.

Call Monitor:

When the Handset is offhook, pressing the MON key will route RX audio to the main speaker, as well as, the handset. Pressing the MON key again will deactivate the function. The MON LED will be lit while the function is active.

NOTE: When the handset is taken offhook, the Monitor function is active. The MON LED is illuminated and receive audio is present at the main speaker.

SF Guard and Hold Tone Setup:

The Guard and Hold Tones used in SF mode are adjusted in precisely the same manner as normal mode. See the manual for a detailed description of the procedure. The SF frequency is fixed at 2600Hz.

Operation Mode: EMSTEL version

This version shall be configured to operate in a multi-party, four-wire private network. This network can use up to 10 digit DTMF signaling.

The unit will detect a specific DTMF dial string and ring for a predetermined amount of time. The unit has a DTMF keypad that can be used to send digits manually or to program up to 4 DTMF sequences of up to 10 digits each.

Specific Requirements:

- a) The unit provides a balanced and protected 4-wire voice interface of 600 ohms.
- b) The nominal audio levels are 0 dBm0 transmit and -10 dBm0 receive.
- c) The unit can detect up to 10 dialed digits.
- d) A logging audio output that normalizes and sums transmit and receive levels is provided on the Auxiliary output port.

- e) A dry contact output indicating incoming ringing shall be provided. This is used to drive external ring generators.
- f) A ring-back tone will be returned for the duration of the ring period. The ring-back level shall be 10 dB below the nominal transmit level.
- g) The ring type and level are adjustable. There are 8 different rings. The ring level is adjustable only while the ring is occurring.
- h) The ring duration is adjustable for 1 to 10 rings, with the default being 4 rings. The ring period is fixed at 1 second ring, followed by 2 seconds of silence.
- i) The unit shall have a PTT handset with a standard four-wire RJ-9 coil cord.
- j) The unit shall have a built in speaker with volume control. The speaker shall permit monitoring the line while the handset is on-hook.
- k) A Monitor function is provided such that if the handset is on or offhook and a call is in progress the RX audio can be routed to the main speaker. This is accomplished by pressing the MON key.
- l) Volume controls for Ringing, Handset and Main speaker audio are independently adjustable.
- m) Line equalization is selectable.

General Operation:

Outgoing Call:

Take the handset offhook, the display will show "OC" for Outgoing Call. The user can listen to the multi-party audio on RX. A DTMF sequence or audio can be transmitted at this time.

Incoming Call:

When the predetermined DTMF sequence is received, the system will start the ring process and display "IC" for Incoming Call. The ring will continue until the handset is taken offhook or the ring duration expires. The volume of the ring can be adjusted only while the ring is occurring.

Call In Progress:

When the handset is taken offhook, after the predetermined DTMF sequence has been received, the call status will change to In Progress. The display will show "CP" for Call In Progress.

No Call:

When the handset is placed back onhook, the call is terminated. The display will be blank and if the Monitor key has been pressed, it will be deactivated.

Call Monitor:

When the Handset is offhook, pressing the MON key will route RX audio to the main speaker, as well as, the handset. When the Handset in onhook, pressing MON key will route RX audio to the main speaker only. Pressing the MON key again will de-activate the function. The MON LED will be lit while the function is active. Changing the status of the Handset hook switch will deactivate the MON function.