

## APPENDIX F

### MSE Interoperability with EAC

#### F-1. Non-MSE Communications Interfaces

In the MSE network, access for analog communications is provided by the following.

a. The Tri-Service Tactical Communications (TRI-TAC) network provides NATO, defense switching network (DSN), and commercial office access at EAC.

b. At echelons corps and below (ECB), MSE communications will interface through an NS for NATO via an NAI.

c. DSN and commercial office access is provided through a LENS or SENS via single frequency and direct current closure line interface.

d. Army Tactical Communications System (ATACS) analog switches will normally access MSE through the TRI-TAC network.

e. Calls to EAC are routed via flood search until a gateway NS is found that has a digital transmission group (DTG) interfacing with TRI-TAC. The NS then routes the calls deterministically through the interfacing DTG to the TRI-TAC network as if the NS were a TRI-TAC switch.

f. Direct dialing is possible using area codes. Calls between corps, to DSN and NATO, or commercial offices are identified by area codes and routed to the required gateway (MSE, TRI-TAC) regardless of which numbering plan is used. Each switch must be programmed by the switch personnel for its home area code. The NS gateway to TRI-TAC will also have the corps area code for the interfacing DTG. The TRI-TAC switch will be programmed in the same way for the MSE NS gateway access into the corps network.

g. Calls routed through some gateways have the potential of call completion delays.

F-2. Interoperability Considerations for EAC to ECB Interface

Table F-1 gives the specified items to successfully interoperate between EAC and ECB communications systems. Technical parameters must be coordinated prior to deployment.

Table F-1. EAC and ECB interoperability.

|                   |   |
|-------------------|---|
| Timing source     | - Highest accuracy/stability source must be specified. The NS and the AN/TTC-39A have an atomic standard; the AN/TTC-39 does not. The NS and AN/TTC-39A can slave off of each other if necessary; however, when interfacing to the AN/TTC-39 the NS is the timing master and the AN/TTC-39 derives its timing from the NS. The AN/TRC-151 and TACSAT terminals have no timing standards. They derive their timing from the switch to which they are connected. (Except the AN/TTC-39 where timing is derived from the switch at the other end of the link.) The AN/TRC-170 has an atomic standard, so it can derive its timing from its own clock or it can slave off the NS or AN/TTC-39A. |
| Group rate        | - TRI-TAC rates should be used for MSE LOS and troposcatter radio sets AN/TRC-170 (multiples of 16 in the range of 256 to 2048 kb/s). Group rates of 512 (32 channels at 16 kb/s per channel) are suggested. The ATACS rates (multiples of 48 in the range of 576 to 2304) should be used for satellite and LOS AN/TRC-151. Group rates of 576 are suggested for TACSAT and AN/TRC-151.   |
| Cable modulation  | - Diphas modulation should be used for TRI-TAC (satellite terminals with TRI-TAC port or MD-1026/GM and AN/TRC-170). Dipulse modulation should be used for ATACS (AN/TRC-151).  |
| Cable length      | - Maximum reels/miles allowed for bit rate (suggestions follow).  |
| Cable adjust      | - Transmit and receive at each end of cable link.   |
| Signaling channel | - First for common channel signaling (CCS).   |
| Routing channel   | - Not applicable. No flood search routing to EAC.   |
| Traffic channels  | - Second through last (based on group rate and channel rate). Group rates of 576 and 512 are recommended for NS-EAC using 16 kb/s channel rate requiring 32 channels for each interface.  |
| Control node      | - Typically EAC (AN/TTC-39 or AN/TTC-39A) but could be either NS or EAC.  |
| Glare             | - Accept at slave node. Reject at master node.  |

F-3. Equipment Set Up for NS to EAC

a. The CX-11230/G cable is issued in ¼-mile reels. The reels of cable can be combined to accommodate distances of ½, ¾, and 1 mile. The following tables have three entries for the CX-11230/G cable: cable reels, cable transmit (xmit), and cable receive (rev). Cable reels give the number of reels used (1, 2, 3, or 4). Cable transmit and cable receive give the corresponding entries for the number of cable reels used.

NOTE: In the following tables, "1m" means 1 mile, "NA" means not applicable, and "No Adj" means no adjustment.

b. Table F-2 lists the cable adjustment settings for the NS to EAC via the AN/TRC-151.

Table F-2. NS to EAC via AN/TRC-151.

|                  | <b>NS</b> | <b>TRC-151</b> | <b>TRC-151</b> | <b>TTC-39/39A</b> |
|------------------|-----------|----------------|----------------|-------------------|
| Timing           | Master    | NA             | NA             | Slave/Master      |
| Bit rate         | 576 kb/s  | 576 kb/s       | 576 kb/s       | 576 kb/s          |
| Modulation       | Dipulse   | Dipulse        | Dipulse        | Dipulse           |
| Cable reels      | 1/2/3/4   | 1/2/3/4        | 1/2/3/4        | 1/2/3/4           |
| Cable xmit       | 4/4/4/4   | e/e/e/e        | e/e/e/e        | 4/4/4/4           |
| Cable rcv        | 1/2/3/4   | b/c/d/e        | b/c/d/e        | 1/2/3/4           |
| CCS channel      | 1st       | NA             | NA             | 1st               |
| RSS channel      | NA        | NA             | NA             | NA                |
| Traffic channels | 2-32      | NA             | NA             | 2-32              |
| Control node     | No        | No             | Yes            | Yes               |
| Glare            | Accept    | NA             | NA             | Reject            |

NOTE: The AN/TTC-39 must be set to SLAVE.

c. Table F-3 lists the cable adjustment settings for the NS to EAC via the AN/TRC-170.

Table F-3. NS to EAC via AN/TRC-170.

|                         | <b>NS</b>       | <b>TRC-170</b>  | <b>TRC-170/170</b>   | <b>TTC-39/39A</b>   |
|-------------------------|-----------------|-----------------|----------------------|---------------------|
| <b>Timing</b>           | <b>Master</b>   | <b>Group</b>    | <b>Mission/Group</b> | <b>Slave/Master</b> |
| <b>Bit rate</b>         | <b>512 kb/s</b> | <b>512 kb/s</b> | <b>512 kb/s</b>      | <b>512 kb/s</b>     |
| <b>Modulation</b>       | <b>Diphase</b>  | <b>Diphase</b>  | <b>Diphase</b>       | <b>Diphase</b>      |
| <b>Cable reels</b>      | <b>1/2/3/4</b>  | <b>No Adj</b>   | <b>No Adj</b>        | <b>1/2/3/4</b>      |
| <b>Cable xmit</b>       | <b>4/4/4/4</b>  | <b>No Adj</b>   | <b>No Adj</b>        | <b>4/4/4/4</b>      |
| <b>Cable rcv</b>        | <b>1/2/3/4</b>  | <b>No Adj</b>   | <b>No Adj</b>        | <b>1/2/3/4</b>      |
| <b>CCS channel</b>      | <b>1st</b>      | <b>NA</b>       | <b>NA</b>            | <b>1st</b>          |
| <b>RSS channel</b>      | <b>NA</b>       | <b>NA</b>       | <b>NA</b>            | <b>NA</b>           |
| <b>Traffic channels</b> | <b>2-32</b>     | <b>NA</b>       | <b>NA</b>            | <b>2-32</b>         |
| <b>Control node</b>     | <b>No</b>       | <b>No</b>       | <b>Yes</b>           | <b>Yes</b>          |
| <b>Glare</b>            | <b>Accept</b>   | <b>NA</b>       | <b>NA</b>            | <b>Reject</b>       |

**NOTE 1: The AN/TTC-39 must be set to SLAVE.**

**NOTE 2: Mission entry for the AN/TRC-170 indicates the unit should use distant end for timing.**

**NOTE 3: Group entry for the AN/TRC-170 directs the unit to use whichever timing source is on the group entering the unit (for example, the NS or AN/TTC-39A; whichever it is connected to).**

d. Table F-4 lists the cable adjustment settings for the NS to EAC via AN/TRC-173/174 radios.

Table F-4. NS to EAC via AN/TRC-173/174.

|                         | <b>NS</b>       | <b>TRC-173/174</b> | <b>TRC-173/174</b> | <b>TTC-39A</b>  |
|-------------------------|-----------------|--------------------|--------------------|-----------------|
| <b>Timing</b>           | <b>Master</b>   | <b>NA</b>          | <b>NA</b>          | <b>Master</b>   |
| <b>Bit rate</b>         | <b>512 kb/s</b> | <b>512 kb/s</b>    | <b>512 kb/s</b>    | <b>512 kb/s</b> |
| <b>Modulation</b>       | <b>Diphase</b>  | <b>Diphase</b>     | <b>Diphase</b>     | <b>Diphase</b>  |
| <b>Cable reels</b>      | <b>1/2/3/4</b>  | <b>No Adj</b>      | <b>No Adj</b>      | <b>1/2/3/4</b>  |
| <b>Cable xmit</b>       | <b>4/4/4/4</b>  | <b>No Adj</b>      | <b>No Adj</b>      | <b>4/4/4/4</b>  |
| <b>Cable rcv</b>        | <b>1/2/3/4</b>  | <b>No Adj</b>      | <b>No Adj</b>      | <b>1/2/3/4</b>  |
| <b>CCS channel</b>      | <b>1st</b>      | <b>NA</b>          | <b>NA</b>          | <b>1st</b>      |
| <b>RSS channel</b>      | <b>NA</b>       | <b>NA</b>          | <b>NA</b>          | <b>NA</b>       |
| <b>Traffic channels</b> | <b>2-32</b>     | <b>NA</b>          | <b>NA</b>          | <b>2-32</b>     |
| <b>Control node</b>     | <b>No</b>       | <b>No</b>          | <b>Yes</b>         | <b>Yes</b>      |
| <b>Glare</b>            | <b>Accept</b>   | <b>NA</b>          | <b>NA</b>          | <b>Reject</b>   |

e. Table F-5 lists the cable adjustment settings for the NS to EAC via AN/TSC-85A/93A (using TD-1337 TRI-TAC port).

Table F-5. NS to EAC via AN/TSC-85A/93A.

|                         | <b>NS</b>       | <b>TSC-93A/85A</b> | <b>TSC-85A/93A</b> | <b>TTC-39/39A</b>   |
|-------------------------|-----------------|--------------------|--------------------|---------------------|
| <b>Timing</b>           | <b>Master</b>   | <b>CNCE</b>        | <b>Slave/CNCE</b>  | <b>Slave/Master</b> |
| <b>Bit rate</b>         | <b>576 kb/s</b> | <b>576 kb/s</b>    | <b>576 kb/s</b>    | <b>576 kb/s</b>     |
| <b>Modulation</b>       | <b>Diphase</b>  | <b>Diphase</b>     | <b>Diphase</b>     | <b>Diphase</b>      |
| <b>Cable reels</b>      | <b>1/2/3/4</b>  | <b>1/2/3/4</b>     | <b>1/2/3/4</b>     | <b>1/2/3/4</b>      |
| <b>Cable xmit</b>       | <b>4/4/4/4</b>  | <b>1/2/3/4</b>     | <b>1/2/3/4</b>     | <b>4/4/4/4</b>      |
| <b>Cable rcv</b>        | <b>4/4/4/4</b>  | <b>1/2/3/4</b>     | <b>1/2/3/4</b>     | <b>4/4/4/4</b>      |
| <b>CCS channel</b>      | <b>1st</b>      | <b>NA</b>          | <b>NA</b>          | <b>1st</b>          |
| <b>RSS channel</b>      | <b>NA</b>       | <b>NA</b>          | <b>NA</b>          | <b>NA</b>           |
| <b>Traffic channels</b> | <b>2-32</b>     | <b>NA</b>          | <b>NA</b>          | <b>2-32</b>         |
| <b>Control node</b>     | <b>No</b>       | <b>No</b>          | <b>Yes</b>         | <b>Yes</b>          |
| <b>Glare</b>            | <b>Accept</b>   | <b>NA</b>          | <b>NA</b>          | <b>Reject</b>       |

**NOTE 1:** CNCE entry for the AN/TSC-85A and the AN/TSC-93A is to designate that unit as the timing slave to the group coming from NS or AN/TTC-39A.

**NOTE 2:** Slave entry for the AN/TSC-85A and the AN/TSC-93A is to designate that unit as the timing slave to whatever source is available.

f. Table F-6 lists the cable adjustment settings for the NS to EAC via AN/TSC-85A/93A (using MD-1026).

Table F-6. NS to EAC via AN/TSC-85A/93A.

|                         | <b>NS</b>       | <b>TSC-85A/93A</b> | <b>TSC-85A/93A</b> | <b>TTC-39/39A</b>   |
|-------------------------|-----------------|--------------------|--------------------|---------------------|
| <b>Timing</b>           | <b>Master</b>   | <b>CNCE</b>        | <b>Slave/CNCE</b>  | <b>Slave/Master</b> |
| <b>Bit rate</b>         | <b>576 kb/s</b> | <b>576 kb/s</b>    | <b>576 kb/s</b>    | <b>576 kb/s</b>     |
| <b>Modulation</b>       | <b>Diphase</b>  | <b>Diphase</b>     | <b>Diphase</b>     | <b>Diphase</b>      |
| <b>Cable reels</b>      | <b>1/2/3/4</b>  | <b>1/2/3/4</b>     | <b>1/2/3/4</b>     | <b>1/2/3/4</b>      |
| <b>Cable xmit</b>       | <b>4/4/4/4</b>  | <b>No Adj</b>      | <b>No Adj</b>      | <b>4/4/4/4</b>      |
| <b>Cable rcv</b>        | <b>1/2/3/4</b>  | <b>No Adj</b>      | <b>No Adj</b>      | <b>1/2/3/4</b>      |
| <b>CCS channel</b>      | <b>1st</b>      | <b>NA</b>          | <b>NA</b>          | <b>1st</b>          |
| <b>RSS channel</b>      | <b>NA</b>       | <b>NA</b>          | <b>NA</b>          | <b>NA</b>           |
| <b>Traffic channels</b> | <b>2-32</b>     | <b>NA</b>          | <b>NA</b>          | <b>2-32</b>         |
| <b>Control node</b>     | <b>No</b>       | <b>No</b>          | <b>Yes</b>         | <b>Yes</b>          |
| <b>Glare</b>            | <b>Accept</b>   | <b>NA</b>          | <b>NA</b>          | <b>Reject</b>       |

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g. Table F-7 lists the cable adjustment settings for the NS to NS via the AN/TSC-85A/93A (using TD-1337 TRI-TAC port).

Table F-7. NS to NS via AN/TSC-85A/93A.

|                         | <b>NS</b>        | <b>TSC-85A</b>   | <b>TSC-93A</b>   | <b>NS</b>        |
|-------------------------|------------------|------------------|------------------|------------------|
| <b>Timing</b>           | <b>Master</b>    | <b>CNCE</b>      | <b>CNCE</b>      | <b>Master</b>    |
| <b>Bit rate</b>         | <b>1152 kb/s</b> | <b>1152 kb/s</b> | <b>1152 kb/s</b> | <b>1152 kb/s</b> |
| <b>Modulation</b>       | <b>Diphase</b>   | <b>Diphase</b>   | <b>Diphase</b>   | <b>Diphase</b>   |
| <b>Cable reels</b>      | <b>1/2/3/4</b>   | <b>1/2/3/4</b>   | <b>1/2/3/4</b>   | <b>1/2/3/4</b>   |
| <b>Cable xmit</b>       | <b>4/4/4/4</b>   | <b>1/2/3/4</b>   | <b>1/2/3/4</b>   | <b>4/4/4/4</b>   |
| <b>Cable rcv</b>        | <b>4/4/4/4</b>   | <b>1/2/3/4</b>   | <b>1/2/3/4</b>   | <b>4/4/4/4</b>   |
| <b>CCS channel</b>      | <b>1st</b>       | <b>NA</b>        | <b>NA</b>        | <b>1st</b>       |
| <b>RSS channel</b>      | <b>2d</b>        | <b>NA</b>        | <b>NA</b>        | <b>2d</b>        |
| <b>Traffic channels</b> | <b>3-64</b>      | <b>NA</b>        | <b>NA</b>        | <b>3-64</b>      |
| <b>Control node</b>     | <b>Yes</b>       | <b>Yes</b>       | <b>No</b>        | <b>No</b>        |
| <b>Glare</b>            | <b>Reject</b>    | <b>NA</b>        | <b>NA</b>        | <b>Accept</b>    |