Nucleus® Paging Station Configuration for I-20 Protocol

Scope of Document

This document is intended for use by experienced technicians familiar with Nucleus paging stations and Glenayre C2010 transmitter controller equipment. It contains information required for the equipment described.

This document is not intended to replace the system and equipment training offered by Motorola and Glenayre although it can be used to supplement or enhance the knowledge gained through such training.

Note: The WMtxp protocol is a superset of the standard ERMES I20 interface protocol.

Related Documentation

- For the hardware installation, *Nucleus® Paging Station I-20 Upgrade,* Motorola part number 6881100F56

- For more information regarding Nucleus paging stations, see *Nucleus® Paging Station Installation and Operation,* Motorola part number 6881002F05 (formerly 6881000F10) and *Nucleus® II Paging Station User's Guide*, Motorola part number 6881000F80

- *GL-C2010* (version 3.1 or later), *Transmitter Controller User Manual*, Glenayre part number 9110.00930

Introduction and Overview

The WMtxp protocol provides a physical and logical connection between a transmitter controller and the Nucleus paging station. The WMtxp protocol is comprised of two layers of information. The lowest layer, the data link layer, includes that functionality which is required to guarantee the delivery and integrity of the transmission of the data packets. This layer provides for a duplex, 9600 Baud transmission and reception of the packets. The second layer provides applications level information. This layer resides in the DATA field of the data packets and carries application bound information of messages.

The Nucleus paging station, when ordered with the WMtxp protocol option, arrives with a new SCM board (part number PTYN4059C) and its matched Exciter. The SCM has a new load of software, version 4.1 or later, which supports many of the basic WMtxp command sets (originated in Europe) as described in Motorola's marketing literature (MPD) in addition to the Glenayre extended command set (now known as the WMtxp protocol).

Note: Read this entire procedure prior to beginning the configuration.

Paging Station Configuration for the GL-C2000/C2010 Transmitter Controller

To support the Glenayre basic and extended command and alarm set, the following is a required configuration for the Nucleus paging station using a GL-C2000/C2010 transmitter controller.

1. Verify the configuration by using friendly interface protocol system (FIPS) commands (see Table 1).

Table 1: Required Configuration

Configuration	Parameter	FIPS Command	FIPS Response	Value
ReFLEX	Enabled	r 81	rw 81	141
Opt. 1	Frequency Ref.Type	r180	rw180	3
1600 bps Deviation	FLEX level	r 231	rw 231	0
Opt. 1	Antenna Relay	r705	rw705	1
WMtxp Interface	Enabled	r 230	rw 230	1

Note: When WMtxp is enabled, the default is External High.

2. Use Table 2 to configure forward power through the C2000/C2010 transmitter controller.

   Forward power settings may vary depending on the station type.

Note: The examples in this document use settings for the 300 W, 900 MHz Nucleus paging station.

Table 2: Forward Power Ranges

Station Type	Range (watts)
125 W VHF	25–125
350 W VHF	100–350
125 W 280 MHz	25–125
300 W 280 MHz	100–300
100 W UHF	10–100
100 W 900 MHz	10–100
300 W 900 MHz	100–300

3. From the C2000/2010 screens:
   – Keyup time: 200 milliseconds
   – Key Downtime: 100 milliseconds
   – Frequency Change Time: 200 milliseconds
   – Exciter PA delay: 25.605 milliseconds

Note: When Nucleus and Glenayre paging stations are mixed in a simulcast system, transport delays must be specified for each station type.

Configure the Nucleus paging station for WMtxp operation with the GL-C2000/C2010 transmitter controller as follows:

4.   Using a null modem cable, connect a PC with a terminal emulation program, such as PROCOMM, to the front panel serial port located on the SCM.

5.   Configure the PC serial interface terminal to the appropriate parameters (see Table 3).

Table 3: PC Interface Parameters

Description	Setting
Baud rate	9600 (Default value)
Parity rate	none
Data bits	8
Stop bits	1
Duplex	Full
Emulation	VT100

6.   At the terminal, press:

    <Return>

    The system responds:

    ENTER PROTOCOL

7.   Type: **fips <Return>**

    The system responds:

    ENTER PASSWORD

8.   Type: **6000 <Return>**

    The system responds:

    FIPS:

9.   Refer to the two checklists (see Table 4 and Table 5) located at the end of this document. Complete the items on the two checklists prior to proceeding beyond this point.

GL-C2010 Transmitter Controller Login

The Login Display appears when you reset the C2010 unit and press <Return> two times (see Figure 1). This screen allows two levels of access to the C2010 transmitter controller.

•   Supervisor (User Number 1)

•   User (User Number 2: read-only)

```
┌──────────────────────────────────────────────────────────────────────┐
│                        C2010 Login - Unit Name                         │
│                                                                        │
│                                                                        │
│                     1. User Number:                                    │
│                     2. Password:                                       │
│                                                                        │
│                                                                        │
│            Software Version            9710221102 c2000/v3.10_rel tn    │
│                                                                        │
│            Site ID (hex)               ODEAF-0                          │
│            Login Count                 00                               │
│                                                                        │
│            Hardware Configuration      S24HINN                         │
│                                                                        │
│            Last Login Date/Time        1997-01-01-00:00                 │
│                                                                        │
│                                                                        │
│   Select option                                       Command:_         │
└──────────────────────────────────────────────────────────────────────┘
```

Figure 1: GL-C2010 Controller Login Screen

1.   Type: **1 <Return>**

   The system responds:

   1:

2.   Type your user number (1 or 2): **1 <Tab>**

   This moves the cursor to the second line (Password)

3.   Type: **abcd <Return>**

Note: abcd is the factory default password for user 1.

   Entering the password returns the cursor to the command line.

4.   At the terminal, press the LINEFEED key until "ACCEPT" appears or type the letter "A".

   Press: **<Return>**

The system supervisor's version of the menu provides access to the displays shown in the following screens. The standard user menu contains only the first three items of the supervisor's main menu screen (see Figure 2).

```
                        C2010 Main Menu - Unit Name

                        1. C2010 Status
                        2. Alarm History
                        3. Alarm Status
                        4. Network Link Menu
                        5. Zone Configuration And Status Summary
                        6. Exciter Output Configuration
                        7. I20 Transmitter Menu
                        8. Alarm Configuration Menu
                        9. Synchronization Menu
                        10. User Configuration
                        11. Database Reset (to default values)


 Select option                                            Command:_
```

Figure 2: Main Menu

To select an item from the main menu; type the number corresponding to the item;

Press: **<Return>**

The system displays the selected items menu screen.

C2000/2010 Status Screen

The supervisor or user has access to the C2010 Transmitter Controller Status Menu. This screen displays the current status of the C2010 Transmitter Controller (see Figure 3).

```
                            C2010 Status - Unit Name


Site ID (hex)                     00000-0        Active Alarms        0

NIC Status                        Online         Exciter mode         Online
NIC Receiving                     Yes            Alarm key mode       Normal
Modem Synchronized                Yes            Alarm fall mode      Normal
Modem Receiving                   Yes            Transmitter Keyed    No
IP Packets Lost  (2 min)          0              Frequency            1
Regeneration errors (2 min)       0              Zone                 0

Time valid                        Yes
Synchronize to GPS                Yes
Date/Time                         1997-01-31 20:57:20
Estimated Error μs)               1
GPS time status                   GPS time valid
GPS receiver status               Full accuracy
GPS satellites                    12 13 16 18
Hardware configuration            S24HINN
Software version                  9710221102 c2000/v3.10_rel tn
NIC software version              9710221354 ip2010/vi.0_rel nic


Select option                                           Command:_
```

Figure 3: C2010 Transmitter Controller Status Screen

C2010 Network Link Control Menu

The Network Link Control Menu allows the supervisor to configure the C2000/2010 IP Network card and monitor the status of the network connection (see Figure 4).

The commands available for the two items (1 or 2) shown in the Network Link Control Menu Screen are; ACCEPT, FINISH, UNDO, OUT, and, HOME.
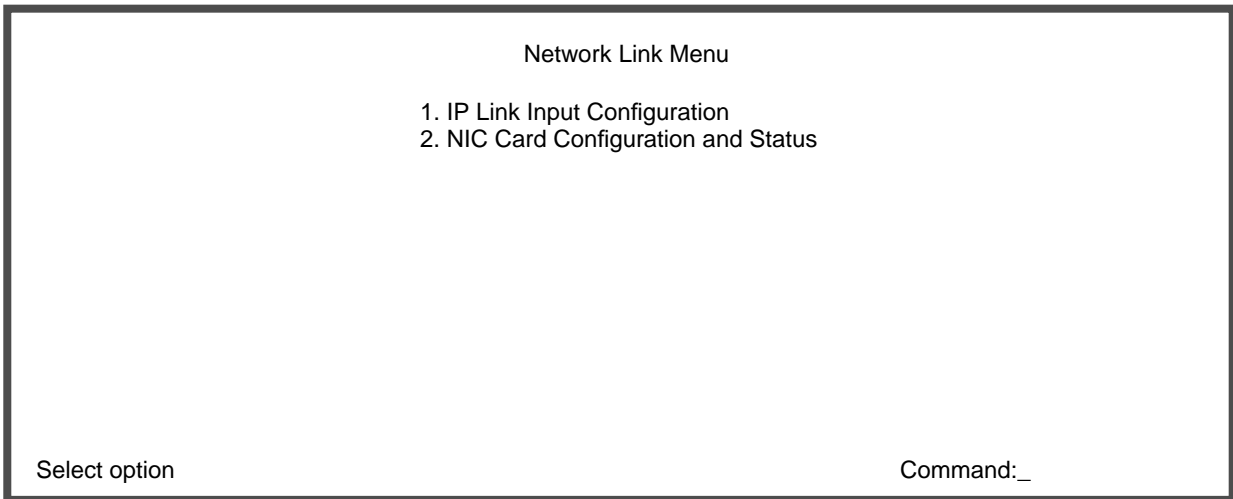
```
                              Network Link Menu

                    1. IP Link Input Configuration
                    2. NIC Card Configuration and Status








  Select option                                              Command:_
```

Figure 4: C2010 Network Link Control Menu Screen

IP Link Input Configuration Menu

The IP Link Input Configuration Menu screen (see Figure 5) shows the specific digital paging link information for the C2010 Transmitter Controller.
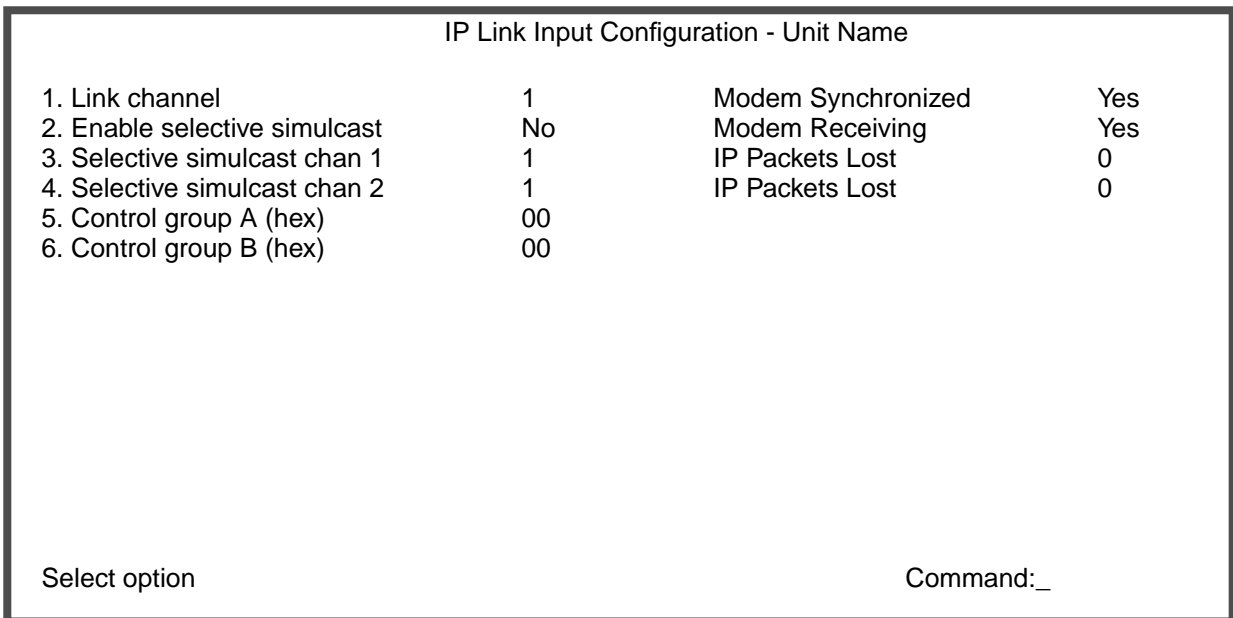
```
                     IP Link Input Configuration - Unit Name

  1. Link channel                    1        Modem Synchronized        Yes
  2. Enable selective simulcast      No       Modem Receiving           Yes
  3. Selective simulcast chan 1      1        IP Packets Lost           0
  4. Selective simulcast chan 2      1        IP Packets Lost           0
  5. Control group A (hex)           00
  6. Control group B (hex)           00










  Select option                                              Command:_
```

Figure 5: IP Link Input Configuration Menu Screen

NIC Configuration Fields

The NIC configuration fields display the configured NIC parameters in two columns. The request field specifies the desired configuration value; the setting field displays the current value configured by the NIC (see Figure 6). The fields are defined as follows:

- Network Type: Configure the NIC to use an Ethernet or PPP network interface

- IP Multicast Address: The Multicast IP address to which paging traffic data is transmitted.

- IP Multicast Address II: The redundant Multicast IP address to which paging traffic data is transmitted.

- Unit IP Address: The IP address of this specific C2010 Transmitter Controller unit.

- IP Address Mask: IP Address Mask to apply to the Unit IP address.

- Router IP Address: (Used in Ethernet mode) Address of the routers Ethernet interface.

- IGMP Reporting: To enable or disable the IGMP reporting feature.

- Unit IP Port ID: The NIC port ID that handles the multicast paging traffic.
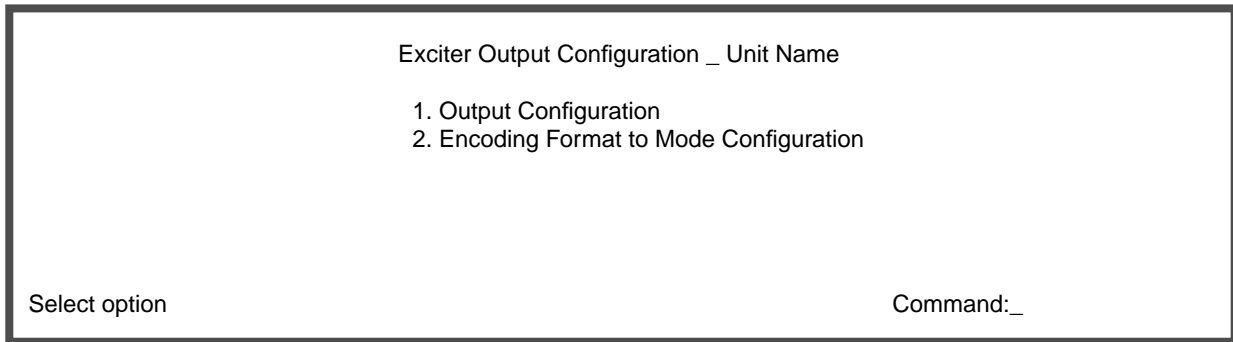
The NIC Status fields (see Figure 6) display status information from the NIC relating to its operation and the state of the paging link.

```
                                 NIC Configuration


                                Request              Settings
1. Network Type                 Ethernet             Ethernet
2. IP Multicast Address         224.2.0.1            224.2.0.1
3. IP Multicast Address  II     224.2.0.2            224.2.0.12
4. Unit IP Address              10.85.8.60           10.85.8.60
5. IP Address Mask              255.255.255.240      255.255.255.240
6. Router IP Address            10.85.8.58           10.85.8.58
7. IGMP Reporting               Yes                  Yes
8. Unit IP Port ID              10000                10000

                                  NIC Status


NIC Status                      Online        PNet Errors (secs)        0
NIC Receiving                   Yes           Driving Link Bus          Yes
NIC-OMC Link                    Connected
NIC Software Version            9710221354 ip2010/vl.0_rel nic

                                  NIC Alarms

IP Fail              No          IP CErr       No      IP PErr           No

Select option                                          Command:_
```

Figure 6: NIC Configuration Screen

Exciter Output Configuration Menu

The Exciter output configuration screen (see Figure 7) contains two options (1 or 2). Only the Output Configuration screen is covered in this document.

Exciter Output Configuration _ Unit Name

    1. Output Configuration
    2. Encoding Format to Mode Configuration

Select option   Command:_

Figure 7: Exciter Output Configuration Menu Screen

Exciter Output Configuration

Only the supervisor has access to the Exciter Output Configuration menu. The options in the configuration menu provides access to the operating parameters of the Exciter and displays the transmitter status of the GL-C2010 Transmitter Controller (see Figure 8). For more information on changing the field in the menu screen, refer to Glenayre *GL-C2010, Version 3.1, Transmitter Controller User Manual*, Glenayre part number 9110.00930.

```
                         Output Configuration - Unit Name

1. Exciter Mode              Online      16. Frequency change time (ms)    200
2. Exciter/PA delay (µs)     0.0         17. Test slot action              Tone F2
3. Simulcast offset (µs)     0.0         18. Test slot mode                Mode A
4. Keyup time (ms)           100         18. Test slot time (ms)           10000.0
5. Key downtime (ms)         100         19. Test slot duration (ms)       30000.0
6. Router IP Address         10.85.8.58  20. Morse code rate (wpm)         30
7. IGMP Reporting            Yes                    Yes
8. Unit IP Port ID           10000                  10000

Deviation:    -100%          -33%        +33%           +100%
6.            LL             LH          HH             HL

       Frequency            Output              Morse Code Station ID
7.              1           HHH
8.              2           HHH           wxyz
9.              3           HHH
10.             4           HHH
11.             5           HHH
12.             6           HHH
13.             7           HHH
14.             8           HHH
15.          Dekeyed        As is

Select option                                            Command:_
```

Figure 8: I20 Exciter Output Configuration Screen

Transmitter Configuration and Status

The transmitter can be programed in different configuration modes depending on the type of control desired (see Figure 9). Information is provided in the following paragraphs for the programming of the configurations available through the controller.

I20 Transmitter Menu

The transmitter menu is for selecting which option to monitor or configure (see Figure 9).

Note: No fields in this screen can be modified.

I20 Transmitter Menu

1. I20 Transmitter Status
2. Glenayre I20 Transmitter Configuration
3. I20 Transmitter Alarm Configuration
4. Basic I20 Transmitter Configuration
5. Reset Exciter

Select option   Command:

Figure 9: I20 Transmitter Menu Screen

To view the status of all configurations, select option 1, I20 Transmitter Status.

To change a configuration, select option 1 through 4 dedending upon the configuration being changed.

To reset the Exciter, select option 5, Reset Exciter.

Viewing I20 Transmitter Status

If you selected option 1, I20 Transmitter Status from the menu, the Transmitter Status screen (see Figure 10) displays showing the current status of the transmitter.

```
                        I20 Transmitter Status -Unit Name
        I20 Tx Type                     Glenayre
                                                    Online              Yes
        Fwd Power (W)           0                   Initialized         Yes
        Refl Power (W)          0                   Offset Freq (Hz)    0
        PA Temp                 0                   I20 channel         1
        Exciter Temp            33

            Glenayre I20 Transmitter Status
        Transmitter Type          NUCLEUS           Status              OK
        Control                   Remote            Keyed               No
        Mode                      Analog            Modulating          No
        Ctrl Ver                  4.1               Frequency (kHz)930875.0
        DSP Ver                   00000000          Freq Control        Serial

 PA1           N/A   PA2           N/A   PA3          N/A   PA4          N/A
 Drvr1 Curr    N/A   Drvr2 Curr    N/A   Drvr3 Curr   N/A   Drvr4 Curr   N/A
 IPA Board     N/A   Preamp Curr   N/A   Exc Output   N/A   PA P.Supply  N/A

            I20 Transmitter Alarm Status
      I20mxout      No   I20mnout       No   I20tmp        No   I20fail  No
      I20refl1      No   I20refl2       No   TxHiCurr      No   TxNoRF No
   TxNoMod No    TxShutdn         No   TxFault        No

 Select option                                        Command:
```

Figure 10: Transmitter Status Screen

The screen is divided into three sections; the top is for I20 Transmitter data, the middle is for Glenayre I20 Transmitter data, and the bottom is for the Alarm data (see Figure 10).

Note: No fields in this screen can be modified.

Fields and Descriptions

Below is a list of the screen fields and their descriptions.

I20 **Tx Type**- Type of I20 transmitter that is installed

 – *Basic*- The basic I20 interface standard is supported by the Nucleus transmitter
 – *Glenayre*- Glenayre's enhanced I20 standard is supported by the Nucleus transmitter

Fwd Power- The transmitter's forward power level, in *watts*

Refl Power- The transmitter's reflected power level, in *watts.*

PA Temp- Temperature of the power amplifier, in *degrees Celsius.*(Not supported by I-20 Nucleus)

Exciter Temp- Temperature of the exciter, in *degrees Celsius.*

On-line

 – *Yes*- I20 transmitter is responding to controller
 – *No*- I20 transmitter is not responding to controller

Initialized

– *Yes*- Controller has initialized all configurable parameters on the I20 transmitter

– *No*- Outstanding configuration request on the I20 transmitter exist

Offset Freq- The current offset frequency, in *Hz.*

I20 Channel- The current channel number *(1 to 8).*

The middle section of the screen shows the Glenayre I20 Transmitter Status (see Figure 10).

Note: *"N/A" indicates that the status is not available. This occurs when the transmitter is off-line, in Local mode, uninitialized, or can not produce the preferred value.*

Transmitter Type- Indentifies the model name of the transmitter attached to the controller.

Control

– *Remote*- The transmitter is being controlled remotely by controller.

– *Local*- Maintenance Access Disable is active and control input will be ignored by the transmitter

Mode- Operating mode of the transmitter, mode A, B, C, D, or N/A.

Ctrl Ver- Software version for the Nucleus SCM. This field can be verified through the front panel of the Nucleus.

DSP Ver- DSP software version for the Exciter/PA. (Not supported by I-20 Nucleus)

Status

– *OK*- Normal operating mode.

– *ALM*- Transmitter has an active alarm, but still operating.

– *FLT*- A transmitter malfunction has occurred causing the transmitter to shut down or reduce power.

Keyed- Identifies if the transmitter is currently keyed.

Modulating- Identifies if the transmitter is currently modulating.

Frequency- Identifies the frequency of the channel currently transmitting in *KHz.*

Freq Control

– *Parallel*- Frequency control is through the hardware frequency select lines. (Not supported by I-20 Nucleus)

– *Serial*- Frequency control is via the serial interface.

– *N/A*- Frequency control status is not available. (Not supported by I-20 Nucleus)

PA1, PA2, PA3, PA4- **S**tatus of PA1, PA2, PA3, and PA4 (Not supported by I-20 Nucleus)

– *OK*- normal operation

– *ALM*- A problem has been detected on the PA board.

– *FLT*- A serious malfunction has been detected on the PA board.

– *N/A*- PA board status is not available.

Drvr1 Curr, Drvr2 Curr, Drvr3 Curr, Drvr4 Curr- Status of current through transistor 1, 2, 3, or 4 on the driver board. <u>(Not supported by I-20 Nucleus)</u>

- – *OK*- normal operation
- – *LO*- current is low
- – *HIGH*- current is high
- – *N/A*- current status in not available

IPA Board- Status of IPA board. <u>(Not supported by I-20 Nucleus)</u>

- – *OK*- normal operation
- – *ALM*- A problem has been detected on the IPA board.
- – *FLT*- A malfunction has been detected on the IPA board
- – *N/A*- IPA board status is not available

Preamp Curr- Status of current through first stage of driver board. <u>(Not supported by I-20 Nucleus)</u>

- – *OK*- normal operation
- – *LO*- current is low
- – *HIGH*- current is high
- – *N/A*- preamp current status in not available

EXC Output- Status of Exciter Output. <u>(Not supported by I-20 Nucleus)</u>

- – *OK*- normal operation
- – *ALM*- A minor problem has been detected with the PA's modulated RF input signal.
- – *FLT*- A serious problem has been detected with the PA's modulated RF input signal.
- – *N/A*- Exciter output status is not available.

PA P.Supply- Status of the PA's power supply. <u>(Not supported by I-20 Nucleus)</u>

- – *OK*- normal operation
- – *ALM*- A problem has been detected with the PA's power supply.
- – *FLT*- A serious malfunction has been detected with the PA's power supply.
- – *N/A*- PA power supply status is not available.

The bottom portion of the screen shows I20 Transmitter Alarm Status (see Figure 10). If an alarm occurs, the affected fields change to Yes.

I20mxout- *Max Forward Power (W)*- This alarm activates if the forward power, in watts, is greater than the alarm limit in the "Limit Setting" field.

I20mnout- *Low Forward Power (W)*- This alarm activates if the forward power, in watts, is less than the alarm limit in the "Limit Setting" field.

I20refl1- *Rel Power Threshold 1(W)*-This alarm activates if the reflected power, in watts, is greater than the alarm limit in the "Limit Setting" field.

I20refl2- *Re Power Threshold 2(W)*- This alarm activates if the reflected power, in watts, is greater than the alarm limit in the "Limit Setting" field. <u>(Not supported by I-20 Nucleus)</u>

I20tmp- *Max Temperature*- The temperature alarm limit is internal to the exciter, and is not configurable. (Not supported by Nucleus)

I20fail- *I20 fault*- A catch-all alarm condition for all I20 alarms

TxNoRF- *No RF*- Transmitter has no RF input from the exciter (Not supported by I-20 Nucleus)

TxNoMod- *No Modulation*- Transmitter is keyed but not modulating (Not supported by I-20 Nucleus)

TxHiCurr- *Tx High Current*- Transmitter has high current (Not supported by I-20 Nucleus)

TxShudn- *Tx Shut Down*- Transmitter shut down due to an extreme alarm condition (Not supported by I-20 Nucleus)

TxFault- *Tx Fault*- Transmitter is running in a fault condition (Not supported by I-20 Nucleus)

Changing the Glenayre Transmitter Configuration

If you selected option 2, Glenayre I20 Transmitter Configuration from the menu, the following screen is shown (see Figure 11):

Glenayre I20 Transmitter Configuration - Unit Name			
1. I20 Tx type	Glenayre	Online	Yes
		Request	Setting
Glenayre Configuration (Common)			
2. Frequency control		Serial	Serial
Glenayre Configuration (Per Channel)			
3. Channel	1 of 8		
4. Forward power (W)		200	200
5. Low power alarm limit (W)		20	20
6. Filter Rise Time (us)		88	88
7. Requested channel frequency (kHz)		0	0
8. Mode A Deviation (Hz)		4500	4500
9. Mode A Offset (Hz)		0	0
10. Mode B Deviation (Hz)		4800	4800
11. Mode B Offset (Hz)		0	0
12. Mode C Deviation (Hz)		2400	2400
13. Mode C Offset (Hz)		0	0
14. Mode D Deviation (Hz)		4800	4688
15. Mode D Offset (Hz)		0	0
Select option			Command:

Figure 11: Glenayre I20 Transmitter Configuration Menu Screen

Fields and Descriptions

Below is a list of the screen fields and their descriptions.

Request: In this column requests for configuration are made.

Setting: In this column fields are updated when valid configuration requests are made. If invalid requests are made, fields in this column are not updated.

I20 Tx type- Basic, Glenayre (WMtxp), None. Changes in this field are reflected in the Basic I20 Transmitter Configuration screen (see Figure 11).

– *Basic mode*- forward power and low power alarm limit are not channel mapped.

– *Glenayre (Extended)*- mode, forward power and low power alarm limit are channel mapped

Frequency control- Possible entries are Serial and Parallel (not supported by I-20 Nucleus)

– Setting: In this column fields are updated when valid configuration requests are made. If invalid requests are made, fields in this column are not updated.

Channel- Choose one of eight available

– Setting: In this column fields are updated when valid configuration requests are made. If invalid requests are made, fields in this column are not updated.

Max Forward power (W)- In extended mode forward power is channel mapped. Forward power varies depending on the range of the PA. Refer to Table 2 for forward power ranges.

Low power alarm limit (W)- In extended mode forward power is channel mapped. The low power alarm limit, in Watts, for the channel selected.

Frequency Rise Time (μs)- Always 88μs

Requested channel frequency (kHz)- Choose the frequency for the channel selected. (Not supported by Nucleus).

In Glenayre (Extended) mode, changes made in fields 8-15 are global and are not channel mapped. The deviation value for field 8 is recommended to be 4500. Deviation values in fields 10, 12 and 14, are read only and are 4800, 2400, and 4688 respectively. Offset values in fields 9, 11, and 13 are changeable in 1 Hz increments. The offset value for Mode D, field 15, is not supported

Deviation and Offset values can be verified through the front panel of the Nucleus.

Deviation (8, 10, 12, 14) (Hz)- Mode A = POCSAG, Mode B = FLEX, Mode C = ReFLEX, Mode D = ERMES

Offset (9, 11, 13, 15) (Hz)- Mode A = low speed, Mode B = high speed, Mode C = ReFLEX, Mode D = high speed- same as Mode B

For additional information, refer to the *Nucleus® Paging Station I20 Upgrade,* Motorola part number 6881100F56.

Changing the Alarm Condition

If you selected option 3, I20 Transmitter Alarm Configuration, the following screen displays (see Figure 12).

Alarm Condition	Name	Active	Limit Request	Limit Setting
1. Max Forward Power (W)	I20mxout	No	100	83
2. Low Forward Power (W)	I20mnout	No	50	50
3. Refl Power Threshold 1 (W)	I20refl1	No	10	10
4. Refl Power Threshold 2 (W)	I20refl2	No	10	10
5. Max Temperature	I20tmp	No		
6. I20 fault	I20fail	No		
Additional Glenayre Alarm Conditions				
7. No RF	TxNoRF	No		
8. No Modulation	TxNoMod	No		
9. Tx High Current	TxHiCurr	No		
10. Tx Shutdown	TxShutdn	No		
11. Tx Fault	TxFault	No		

Select option   Command:

Figure 12: Alarm Condition Screen

Fields and Descriptions

Below is a list of the screen fields and their descriptions.

Limit Request- In this column requests for configuration are made.

Limit Setting- In this column fields are updated when valid configuration requests are made. If invalid requests are made, fields in this column are not updated.

Max Forward Power (W)- *I20mxout*- This alarm activates if the forward power, in watts, is greater than the alarm limit in the "Limit Setting" field. *Fixed to Max fwd Pwr read only.*

Low Forward Power (W)- *I20mnout*- This alarm activates if the forward power, in watts, is less than the alarm limit in the "Limit Setting" field. *Not valid if in Glenayre mode.*

Refl Power Threshold 1 (W)- *I20refl1*- This alarm activates if the reflected power, in watts, is greater than the alarm limit in the "Limit Setting" field. When a value is added it is mapped to all channels for this paging station.

Refl Power Threshold 2 (W)- *I20refl2*- This alarm activates if the reflected power, in watts, is greater than the alarm limit in the "Limit Setting" field. (Not supported by I-20 Nucleus)

Max Temperature- *I20tmp*- The temperature alarm limit is internal to the exciter, and is not configurable. (Not supported by I-20 Nucleus)

I20 fault- *I20fail*- A catch-all alarm condition for all I-20 alarms

No RF- *TxNoRF*- Transmitter has no RF input from the exciter. (Not supported by I-20 Nucleus)

No Modulation- *TxNoMod*- Transmitter is keyed but not modulating. (Not supported by I-20 Nucleus)

Tx High Current- *TxHiCurr*- Transmitter has high current. (Not supported by I-20 Nucleus)

Tx Shut Down- *TxShudn*- Transmitter has shut down due to an extreme alarm condition. (Not supported by I-20 Nucleus)

Tx Fault- *TxFault*- Transmitter is running in a fault condition. (Not supported by I-20 Nucleus)

Changing the I20 Type

If you selected option 4, Basic I20 Transmitter Configuration from the menu, the following screen displays (see Figure 13).

```
1. I20 Tx type          Basic                                        Online      Yes

                                            Request        Setting

2. I20 Forward Power (W)                     250            250
3. I20 Offset Frequency (Hz)                 -10            -10




   Select option                                          Command:
```

Figure 13: Set I20 Type Screen

Request: In this column requests for configuration are made.

Setting: In this column fields are updated when valid configuration requests are made. If invalid requests are made, fields in this column are not updated.

I20 Tx type- Basic, Glenayre (WMtxp), None. Changes in this field are reflected in the Glenayre I20 Transmitter Configuration Screen (see Figure 11).

– In Basic mode forward power is not channel mapped.
– In Glenayre (Extended) mode, forward power is channel mapped.

I20 Forward Power (W)- In Basic mode, the range of the command is 10-255 watts. For Glenayre Extended mode refer to Table 2 for forward power range.

I20 Offset Frequency (Hz)-In Basic mode, selections are made in 2 Hz increments to +/- 510 Hz. For Glenayre Extended mode, the frequency offsets need to be entered using the Glenayre I20 Transmitter Configuration screen.

Verification Checklists

The two checklists in this section (see Table 4 and Table 5) are provided to assist the individual(s) responsible for the installation and configuration of the I-20 Nucleus matched pair. Check off the items in the checklist as they are accomplished. When all items on the checklist have been accomplished, place your signature on the line provided at the end of the last checklist.

Note:　　All ESD procedures must be observed.

Table 4: Site Audit Verification Checklist

	Reference	Verification
Date: **Site Name:** **ST Name:** **Nucleus Serial Number:** **C2000/C2010 Serial Number:** **RMA Number:**		
Hardware Information Exciter (old) Serial #: SCM (old) Serial #:	(Numbers must match)	
New Exciter Serial #: New SCM Serial #:	(Numbers must match)	
Software Information Exciter (new) Software Alignment ID#: SCM (new) Software Alignment ID #:	(Numbers must match) (Numbers must match)	
Upgrade the station hardware as per the I-20 Upgrade FRU (6881100F56)		Verify_____
10 MHz Cabling Inspection		
Verify 10 MHz cabling for proper installation and termination		
I20 Nucleus Verification/Power Alignment Activities		
Battery Revert Check		
Check Battery cables for proper connection		Verify_____
Battery revert check (momentarily turn off the battery back-up on the station)		Verify_____
I20 Cables		
Is External and Internal cables installed properly (Nucleus Paging Station I-20 Upgrade FRU, Motorola part number 6881100F56)		Verify_____
Verify the parameters listed in Table 5		Verify_____
Transmitter RF Power Out Setup and Verification		

Table 4: Site Audit Verification Checklist

	Reference	Verification
Set Mean Power (calibration power) level	Calibrate to the maximum power per customer RF plan	Verify_____
Calibrate RF Power out to 50 ohm load (+/- 5%) (Once keyed, wait 10 minutes for the station to stabilize before beginning calibration)	Refer to the Nucleus User's Guide, 681000F80, Section 14 for Calibration Procedure	_____W
Record reflected power into antenna network		_____W
Record power out of cabinet into antenna		_____W
Deviation and frequency okay on service monitor (Motorola R2600 or equivalent)		Verify_____
C2010 Info		
Confirm C2010 programming Listed in Table 5, Section called Record C2010 Parameters, based on Customer specific C2000/C2010 procedures and C2000/C2010 User Manual		Verify_____
Does C010 have battery back-up		Verify_____
Page a Pager:		
ReFLEX outbound - Read the Pager display (if applicable)		Verify_____
ReFLEX inbound - Verify with customer ACK (if applicable)		Verify_____
Page a FLEX pager and verify the displayed test message (if applicable)		Verify_____
Page a POCSAG pager and verify the displayed message (if applicable)		Verify_____
Call the operations center to commission the site (as applicable)		Verify_____

Table 5: Nucleus I-20 Parameter Checklist (Sheet 1 of 2)

Parameter Keypad	Support/Button	Fips command	Suggested Value	Verification
ReFLEX enable	No	r 81	R 81:141	Verify_____
External 10 MHz Reference	No	r 180	R 180:3	Verify_____
High Speed Splatter Filter (88 µs)	No	r 231	R 231:0	Verify_____
Enable I20 Interface	No	r 230	R 230:1	Verify_____
External High key select	No	r 704	R 704:7	Verify_____
Channel Frequency	Yes/ TX Button If frequency is incorrect refer to the Nucleus Technical Manual, 68P100F80, Section 12	**USE THE KEYPAD**		**ReFLEX/FLEX/POCSAG** CH1: CH2: CH3: CH4: CH5: CH6: CH7: CH8:
Mean Channel Power	Yes/TX Button	w 654	W 654 XXX (where XXX is the power)	Verify_____
Special TX Setup				
TX Data Invert	Yes/TX Button	r 701	R 701:0	Verify_____
TX=RX En/Dis	Yes/TX Button	r 92	R 92:0	Verify_____
TX=RX Channel	Yes/TX Button	r 101	R 101:0	Verify_____
Antenna Relay	Yes/Opt 1 Button	r 705	R 705:1	Verify_____
Ext Circ	Yes/Opt 1 Button	r 168	R 168:0	Verify_____
Software Version (allow 15 seconds for this response)	Yes/Stat Button	a 34	a 34	Verify_____

Note: Verify that both sides, A and B, have the same software version in the flashbanks.

Batt Revert Setup	Yes/Cnfg Button	r 130	R 130:0	Verify_____
Battery Type Sealed Lead Calcium	Yes/Cnfg Button	r 96	R 96:2	Verify_____
Battery Charging	Yes/Cnfg Button	r 98	R 98:1	Verify_____
Backup Control	Yes/Cnfg Button		Use Keypad	Verify_____
Ext WM type	Yes/Cnfg Button	r 159	R 159:0	Verify_____
RX type	Yes/Cnfg Button	r 171	R 171:0	Verify_____

Table 5: Nucleus I-20 Parameter Checklist (Sheet 2 of 2)

Parameter Keypad	Support/Button	Fips command	Suggested Value	Verification
Record C2010 Parameters				
Key down time	100 mS		Screen 6, 1	Verify_____
Key-up time	200 mS		Screen 6, 1	Verify_____
Frequency change time	200 mS		Screen 6, 1	Verify_____
Exciter/PA delay	25605 µs		Screen 6, 1	Verify_____
Enter proper IP address for router	Ref: Customer IP plan and C2010 Procedure		Screen 4, 2	Verify_____
Enter proper IP address for 2010	Ref: Customer IP Plan and C2010 Procedure		Screen 4, 2	Verify_____
C2010 IP Address Mask	Ref: Customer IP Plan and C2010 Procedure		Screen 4, 2	Verify_____
Multicast IP Address	Ref: Customer IP Plan and C2010 Procedure		Screen 4, 2	Verify_____
Set min fwd power alarm	per customer plan		Screen 7, 3	Verify_____W
Set max ref power alarm	per customer plan		Screen 7, 3	Verify_____W

Your signature indicates you have accomplished all of the above:

Signature:_____

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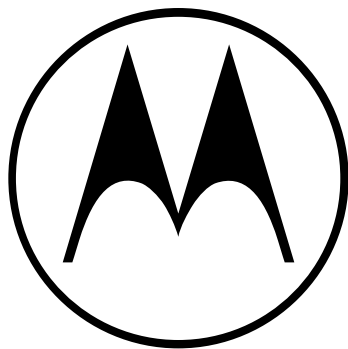Motorola, the Motorola logo, Nucleus, and FLEX are registered trademarks of Motorola, Inc.

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